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Growing Fancy Grapes for Market

By Newton L. Partridge
Michigan Agricultural Experiment Station

THE QUALITY of fruit has a great deal to do with the ease with which it may be marketed, and it usually affects the price which the grower receives for his product. If a grower, organization or region has earned a high reputation for supplying a quality product, it will be no more difficult, to say the very least, to market his fruit than if his baskets were frequently filled with inferior specimens. The marketing of a high-grade fruit stimulates demand, so that it would not be injurious to anyone if all the growers of a state or even of all the regions producing that crop turned out a better package. This would stimulate demand sufficiently so that all would benefit.

The acreage devoted to the production of American bunch grapes has increased to such an extent that there will be more of these grapes on the market during the next decade than there has been during any similar period in the history of American viticulture. In view of the interest in quality pack that is being shown in the various grape producing sections, the production of quality fruit is bound to be of the utmost importance. A real effort should be made to hold the present customers of American bunch grapes and to increase their number as well as the amount used by each consumer.

It is impossible to sell a high-grade fruit unless a high-grade fruit is grown and then packed correctly.

Quality Depends on Several Factors

The quality of a bunch of grapes depends upon a number of factors. Some of these factors depend upon the grower and some depend upon the weather. It is convenient to divide these into two groups, those that influence the beauty of the bunch as a whole and those that affect quality of the berries themselves. The bunches should be large, compact and well-formed. The berries should be well-colored, sweet and free from rot and worms. These characteristics must be present if the fruit is of the highest quality. If they are not, no mark on the outside of the package will make the grapes any better than they actually are when consumed.

The size of bunch depends primarily upon the cane selection that was practiced at the time of pruning the vines. If the canes that were chosen for fruiting were small in size and close-jointed, the bunches will be small at harvest time in spite of anything that can be done after pruning. If large bunches are desired, canes must be saved that have sufficient vigor to produce large bunches. In the case of the Concord vine in Michigan, the canes are about a quarter of an inch in diameter, with the fifth and sixth buds from five to eight inches apart.

Compactness Determined by Number of Blossoms

Compactness of bunch is determined in large part by the proportion of the blossoms that set fruits. This factor is not so easily controlled as the one just mentioned because the weather at blooming time sometimes exerts a great deal of influence upon the percentage of set. If the weather during the bloom is wet, cloudy and cold, there will not be as good a set as if the days were warm, clear and dry. Nevertheless, some of the conditions that influence the percentage of set are under the control of the grower. If the vine has been pruned too little, so that there is a greater number of blossom clusters on the vine than can be well supplied with food materials, the set will be irregular, and many of the bunches will lack in compactness at harvest time. If the vines have been pruned too much, so that the shoot growth is too vigorous during the blooming period, the set will be very poor, and most of the bunches will be scraggly. It should not be necessary to add that this last-mentioned reason for the production of poor bunches is much less frequent than the former; but there are a good many vines of which it is true.

The application of a readily available nitrogenous fertilizer, such as ammonium sulphate or nitrate of soda, has a material influence on set and should be considered in connection with the severity of the pruning given. A vine receiving an early spring fertilization of either of these materials is able to set a larger number of good bunches than is an unfertilized vine. As good bunches may be produced without the use of the nitrogen as may be grown with it; but in that case the vine must be pruned so that there is a smaller number of bunches on it and the grower must be satisfied with a small crop. A failure to set good bunches owing to a need for a spring application of nitrogen is perhaps more likely to occur when this element has been used for a number of years and is then withheld.

Still another influence that may affect compactness is a failure of the berries to reach a size sufficient to fill the bunch in a satisfactory manner. This condition was quite general in Michigan last season. However, when the set was large enough at blooming time, the bunches filled in spite of the fact that the berries were somewhat smaller than usual.

The factors that produce a large, compact bunch are largely controlled by pruning, although the use of fertilizers enables the vine to produce a larger number of bunches of this type. The conditions that are responsible for the production of quality in the berry are largely connected with the cultural operations of the growing season, although pruning has some influence on berry as well as bunch characteristics.

One of the cultural operations which cannot be neglected if quality fruit is to be produced is the proper spraying of the vine. No matter how promising the cluster may be early in the season, if black rot or berry moth be permitted to destroy considerable numbers of berries, the bunches cannot be compact at the harvest.

Normal Nutrition Necessary for Flavor

The chemical compounds that are responsible for the flavor, sweetness, aroma and tartness of the berry are all products of a normal nutrition of the vine. The development of a proper combination of these constituents depends upon a sufficient leaf area to ripen the fruit. Color and sugar usually develop at about the same time while the acidity is decreasing, but they do not always do so. Berries are sometimes found that are edible, but which are not colored sufficiently to yield a well-colored juice; and, on the other hand, well-colored berries that are either lacking in sugar or in which the acid is still too abundant are by no means unknown.

The weather has an important influence upon the maturity of the fruit. It is a fact which has been observed by many, that those years in which crops of the highest quality have been produced are characterized by at least three or four weeks of clear, warm, dry weather preceding and continuing through the harvest. This same sort of weather has characterized the years of famous vintages in France. In addition to the weather requirement, the crop on the vines must not be too large; otherwise, the quality does not reach the highest peak.

Good Weather an Important Factor

The weather, of course, is beyond control. However, whether the weather be good or bad for the production of berry quality, differences in the quality of fruit are found in neighboring vineyards that are due to the man who is producing the crop. Even though there are occasional years when nearly everyone seems to have well-matured crops, and other years when few of the vineyardists are able to secure maturity, an effort can well be made to promote maturity by all means at the grower's disposal.

The most frequent cause of differences in maturity is the fact that some vineyards are producing a larger quantity of fruit in proportion to their capacity to yield than are some of the others. Maturity in any year, within the limits of yield usually observed in commercial production, is roughly proportional to the relationship existing between effective leaf area and the pounds of fruit upon the vine. This relationship can be varied either by changing the amount of the crop or by varying the effective leaf area. This relationship also depends somewhat upon the size of the crop, for when the crop is smaller, the leaf area tends to be larger than usual, and when the crop is larger, the leaf area tends to be smaller than usual. This is due to the fact that the larger the crop, the earlier in the season the canes stop growing and so stop increasing the leaf area of the vine.

Pruning Should Vary According to Vigor

The size of the crop is controlled by the vineyardist who varies the severity of his pruning the preceding winter in accordance with his wish to produce a large or a moderate yield on each of his vines. This is the primary function of vine pruning. Strong vines are able to produce more pounds of fruit, and still produce sufficient leaf area to mature the crop, than weak vines. The greatest criticism of the pruning of most grape growers is that they do not vary the pruning sufficiently between strong and weak vines. It is not difficult to find vineyards where the weak vines are not producing fruit of very high maturity or even failing to color their fruit satisfactorily, while other vines in the same vineyard have been pruned so severely that they are pro-

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June Drop Control of the Apple Curculio

By Robert M. Clark

APPLE GROVE ORCHARDS, in which these observations on the control of the apple curculio were made, are located in Polk county, 15 miles east of Des Moines and south of Mitchellville, Ia. The 20 acres of apple orchard are surrounded on three sides by timbered pasture and woodlot not pastured. Another 30 acres of apple orchard are located several rods away from the timber, and there is a public highway between.

Ten years ago, damage from both the plum and the apple curculio was severe in the 20-acre orchard near the timber. The older apple trees were then about 20 years of age. At that time, the 30-acre orchard, then 12 years old, was free from the apple curculio.

Standard Recommendations Prove Futile

To combat the apple curculio, we vigorously applied the usual recommended methods. We used a heavy spraying schedule, applying an extra lead arsenate coat between the regular calyx spray and the first cover spray, when the apples are about the size of cherries, and at which time the curculio suddenly start feeding and egg-laying in enormous numbers. Cultivation by disking until mid-July was carried on. The trees were pruned for more sunlight. Trashy places in the orchards and along the fences were cleaned up. Woodland on two of the three wooded sides of the 20-acre orchard was thinned out and pastured. When hogs were available, they were at times turned into the orchards for clean-up purposes.

For short periods, these control measures seemed to reduce the damage, but after nine years, there was more injury from the apple curculio. After four or five years, the plum curculio disappeared. Probably the cultivation had much to do with this. The plum curculio changes from larva to beetle stage in the ground and can be disturbed by disking.

Thinning out and turning woodlot into pasture on two sides of the 20-acre orchard has reduced the invasion from the north and west.

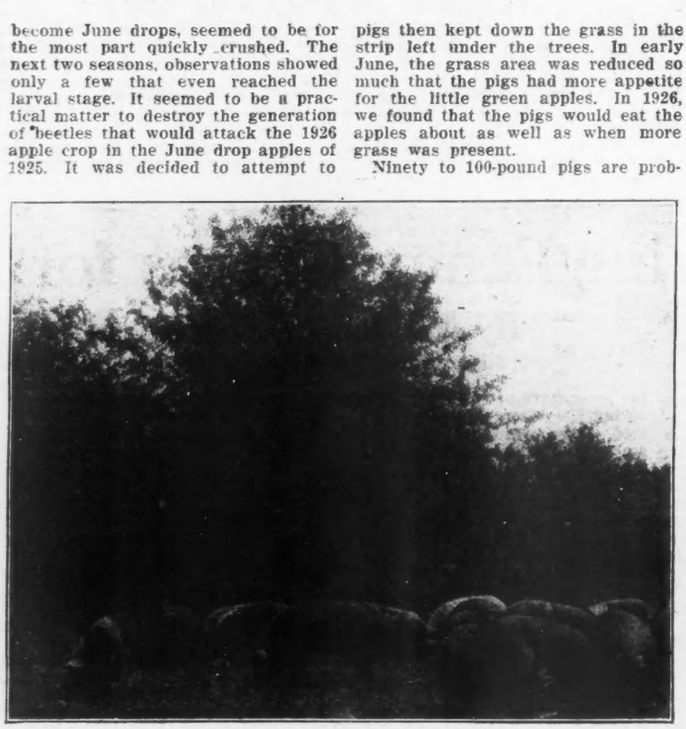
Five years ago, the apple curculio appeared for the first time in the west side, toward the distant timber, of the 30-acre orchard that was 18 years of age. There were two acres of Ben Davis in this part of the orchard. The apple curculio increased on these Ben Davis until in the 1924 crop there were but few sting-free apples. Northwestern Greening rows next to these Ben Davis have scarcely been attacked, but the Grimes Golden and Jonathan nearby have been attacked to a less extent than the Ben Davis.

In the last three years, a few individual apple curculio have been noticed in other parts of the 30-acre orchard. It was evident that something different than the course of the past several years had to be followed or in another few years the younger 30-acre orchard would be showing 50 to 90 per cent curculio stings at harvest time.

Pastured Orchards Give Suggestion

It has been observed that unsprayed farm orchards having about all of the known orchard pests of the Middle West, often did not show the apple curculio injury. Such orchards are commonly used as permanent hog pastures. In 1924, we learned that the numerous grubs and pupae found in withered June drop apples were stages of the apple curculio. Here was a wide difference in the life histories of the plum curculio and the apple curculio. The plum curculio larva leaves the apple and enters the ground to mature into an adult beetle during parts of June and July, where it can be quite effectively destroyed by cultivating. The apple curculio spends about a month as egg larva, pupa and beetle in the withering June drop apples on the ground.

Apple curculio eggs in the fast growing apples on the trees, that failed to become June drops, seemed to be for the most part quickly crushed. The next two seasons, observations showed only a few that even reached the larval stage. It seemed to be a practical matter to destroy the generation of beetles that would attack the 1926 apple crop in the June drop apples of 1925. It was decided to attempt to clean the ground of June drop apples by the use of hungry pigs.



Hogs feeding in an apple orchard

Get Assistance from Experiment Station

In the spring of 1925, Dr. B. B. Fulton of the Entomology Section of the Iowa Agricultural Experiment Station became interested and gave splendid help on the problem throughout 1925 and 1926.

In March, 1925, we bought, at late winter farm auctions and borrowed from a neighbor short of pasture, fall pigs weighing from 60 to 90 pounds. We fenced off the worst apple curculio infested areas for these 65 pigs. The pigs had very little grain until after the clean-up of the June drop apples in July.

In order to make the pigs effective over a larger area during April and May, we destroyed all of the grass in both orchards that could be reached with a 14-foot extension disk. The pigs then kept down the grass in the strip left under the trees. In early June, the grass area was reduced so much that the pigs had more appetite for the little green apples. In 1926, we found that the pigs would eat the apples about as well as when more grass was present.

Ninety to 100-pound pigs are probably more suited to this clean-up, because they are old enough to stand this short feed roughing. It does not cause them to lose weight already gained, as might occur with pigs of greater age and size. They do not ride down tree limbs like the larger hogs. They require less capital and have greater feeding possibilities after the orchards are cleaned of the June drop apples.

Pigs Clean Up Worst Area

In 1925, the pigs accomplished the clean-up on our worst areas, just before the beetles were mature enough to emerge from the June drop apples. For a time, it appeared that the pigs were too few and the time too short, but during the last few days before the beetles were mature, either the pigs were becoming more hungry or the juicy insects made the apples more appetizing, because the pigs ate more apples than in the two preceding weeks, completely cleaning the ground under the apple trees.

Our apple crop on the pig-treated plots turned out a liability, as usual, in the fall of 1925. Dr. Fulton's counts showed 70 per cent of the apples had been injured by the apple curculio. However, there was much encouragement in the fact that the fruit showed but little of the characteristic work of the new brood beetles in the late summer and fall. The spring stings were there, but there were very few of the black perforated spots on the apples that were so noticeable in these parts of the orchards during the 1924 season. The new young apple curculio make such spots by feeding on an apple for long periods, making numerous punctures close together. These spots, sometimes one inch in diameter, dry out and sink down and turn black.

Our hope became fact with the 1926 crop on the pig-treated areas. Dr. Fulton took counts showing only 1.77 per cent injury where there had been 70 per cent injury in 1925. The question would arise as to whether the decrease was due to an unusual climatic condition that had killed off the beetles. We had a check on this, just a few rows away across what had been a temporary fence for the 1925 pig treatment. This and other parts of the orchards that were not treated by pigs in June, 1925, had a normal increase of the apple curculio injury in the 1926 crop.

Results Were Surprising

To harvest 1200 bushels of apples showing less than two per cent apple curculio injury from the two plots making up five acres, where the crop for several years had been almost worthless, seemed to be unbelievable. These five acres prior to 1926 were the most infested part of our orchards. We gave this the most concentrated treatment with five pigs to the acre in June and July, 1925. Another 17-acre portion of the 20-acre orchard, not so badly infested with the apple curculio, was also treated with three pigs to the acre for five weeks. This plot yielded about 4000 bushels of apples in 1926, which were quite free from the curculio injury, but not so clean as the apples from the two plots making up what was formerly the most badly infested five acres.

It seems that it is necessary to run at least five pigs, weighing 100 pounds or over, per acre for four or five weeks following the beginning of the June drop in order to reduce the damage from apple curculio to commercial insignificance in one year. More pigs per acre might do the work in two or three weeks. The number of years treatment is necessary to absolutely eradicate the insect is not yet known. We used pigs again in 1926 over all the area treated in 1925 and also over additional plots. Perhaps we will do away with the 1.77 per cent injury in another year or two. In one year, what was the most infested five acres became the cleanest part of our 50 acres of apple orchard.

Late Eggs Crushed by Fast Growing Apples

Apple curculio egg laying begins late in May in the newly formed apples, many of which go to the ground with the June drop. Eggs are being laid in new little apples until early in July. The late eggs are not important on varieties like the Grimes and Jonathan because they have a habit of completing the June drop early, so that most of the late eggs are destroyed by sound, fast growing apples. Pigs can clean up under such varieties easily within the month between egg and adult beetle emerging from the shriveled apple on the ground along about July 1.

Varieties like the Ben Davis have the habit of continuing the June drop thinning over a period of three or four weeks, so that it is advisable to pasture pigs under this variety for

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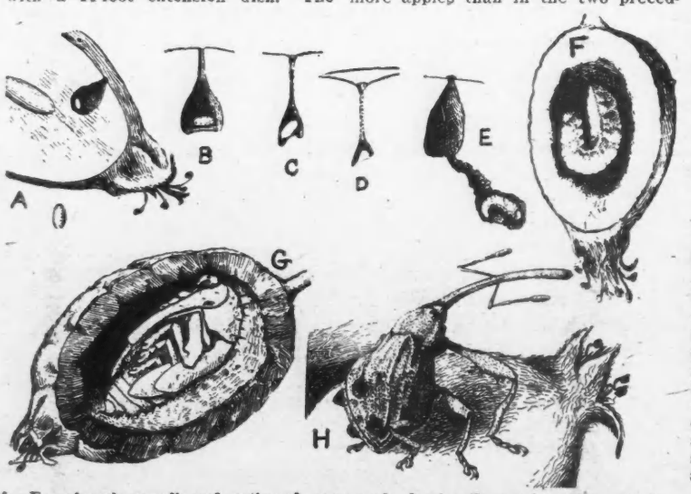

A.—Egg of apple curculio and section of young apple showing the egg in cavity made by the adult. B, C, D.—Sections cut through the egg cavity showing how the egg is crushed by the growth of the apple if it remains on the tree. E.—Young larva feeding on fallen apple. F.—Fallen apple cut in two showing full grown larva in cavity. G.—Fallen apple cut in two showing pupa in cavity. H.—Adult on young apple showing two feeding punctures

Thinning Fruit to Improve Quality

By Joseph Oskamp
Cornell University

IN THE Pacific Northwest, thinning is considered one of the major orchard operations. Here in the East and in the Middle West, we could scarcely accord it such an important position. From our standpoint, it is rather to be looked upon as the last detail in the refinement of orchard practice. As a necessary feature of satisfactory marketing, quality in fruit is receiving more and more emphasis. Thinning is an important means of obtaining better size, color and finish. To some extent, pruning may take the place of thinning but not entirely. It is undoubtedly more important for the average man to give careful attention to spraying, pruning and soil fertility. Then, if he is a careful grower and has properly invested in these other practices, thinning will be to his advantage.

Growers Not Adverse to Thinning

We find many growers are anxious enough to thin, but a shortage of labor makes it quite difficult or almost impossible for them to do so. In fact, this is probably the chief reason why more trees are not thinned in the East. The operation of thinning, which comes the latter half of June or very early in July in New York, for instance, seriously interferes with other farming activities, depending on the section, such as setting cabbage plants, haying, etc. There are very few careful records to indicate just the financial returns that may be expected from proper thinning. However, practically all of the growers without exception who have ever practiced thinning, are firmly convinced in their own minds that they have been well paid. Not infrequently, a crop from an orchard in which the fruit has been thinned will sell for a dollar or more per barrel higher than the crop from the trees of the same varieties unthinned.

There is seldom a season in which some varieties would not be benefited by thinning, although it is not all varieties that need thinning and it may not be desirable to thin, in all seasons. A variety like Wealthy, which is inclined to overbear and produce small fruit, is very often thinned. On the other hand, varieties such as Tompkins King or Mammoth Black Twig (Arkansas), which seldom set a heavy crop and which produce fruit of large size, need little if any thinning.

Better Quality Assured

Among the more important advantages of thinning are a distinct improvement in those characters included under the general term quality. These may be classed under the following heads: (1) larger size; (2) better color; (3) greater uniformity; and (4) fewer culls and off-grade fruit.

Increase in size of fruit is generally the most marked effect of thinning. This adds considerably to the commercial value of the crop. Market quotations continually bring out this point. The premium paid for size will depend on the variety, the market and the use to which the fruit is put. An apple used for baking is demanded in large sizes. Often, a quarter-inch additional size will mean a dollar more per barrel.

Improvement in color is sometimes quite decided. Color in apples is closely associated with the sugar content of the fruit. It takes foliage to make the necessary starch and sugars and properly mature the fruit. In case of an excessive crop, poor color is possible because of the relative re-

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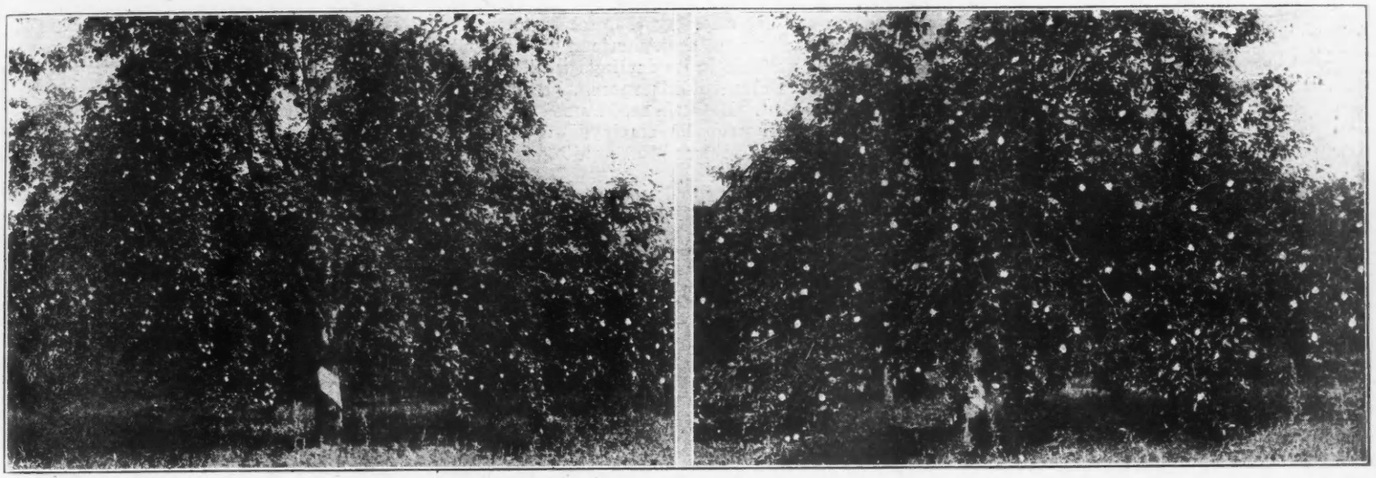

Left.—An 18-year-old New York state Wealthy, unthinned. This tree yielded 11½ bushels of fruit of only fair color, four bushels of which were culls under two inches. Right.—A tree similar in all respects to that shown in the picture at the left, but the fruit was thinned to six inches apart. This tree had 1980 apples removed at thinning and yet yielded 11½ bushels of well-colored fruit of good size

Peach Grower, Watch Your Step

By J. R. Cooper
University of Arkansas

"WATCH YOUR STEP." This succinct statement seen in elevators, on trains and other places where danger lurks for the unwary, might well be accepted by peach growers at this time of heavy planting and generally low prices for agricultural products.

The planting of commercial peach orchards has advanced very rapidly since 1920. The total number of trees in the important commercial districts, has increased approximately 100 per cent to date. At the same time, orchard culture has taken a decided change for the better, so that the crop per tree of the bearing orchards has increased. Considering average mortality of both young and bearing trees and only average care, a conservative estimate will still show an increase of over 50 per cent in production in the next few years.

With this increase in volume of peaches in sight, speculation as to the future of the industry arises. Will or can this increase be absorbed? Will prices remain at such a level that profits are possible? The energies of both growers and scientific workers in the colleges of agriculture have largely been devoted to production. The question for the next few years will be, "What shall we do with what we have produced?" It has almost reached the point at which we will pray for our neighbors to have crop failure and where a bumper crop for the whole country will mean disaster for some of us.

Growers must, because of this probable increase in production, together with the prevailing low prices of farm products, be prepared to meet lower prices and more unfavorable conditions generally than have prevailed for the past several years. It will be necessary to do one of two things—produce peaches at less expense per acre, which is obviously impossible on the whole, or produce more peaches per unit of expense. This may seem like a distinction without a difference, but there is a difference. It is not practicable to attempt to grow peaches at a less cost per acre. In fact, the cost per acre will undoubtedly increase, but the ratio of cost to value of the crop may be lowered through efficiency and intelligent management.

It is hard to point out just where improvement is the most needed. The grower must practice eternal vigilance throughout the life of the orchard to prevent injury to trees and reduction of stand through damage from insects and diseases. Better spraying will, at very little increase in actual expense, increase not only the total crop, but will throw a higher percentage of fruit into a higher class, thus increasing the value in two ways. Thorough spraying is valuable in another way. Any factor which causes the leaves to drop prematurely, or before frost, renders the buds more susceptible to winter injury because of the tendency to advance during warm periods of the winter. Spraying will go a long way towards preserving a normal healthy foliage throughout the season.

Moisture is another very important factor, and while not amenable to direct quantitative control, factors limiting the amount available at critical periods are under our control to such a degree that more moisture may, by the right cultural practices, be assured during critical periods.

Peaches Use Large Quantities of Water

A mature peach tree will use during the growing season 3000 to 3500 gallons of water. In most of the peach districts, the greater part of our precipitation occurs during the early part of the growing season. What is used by the trees later on must be largely conserved by such thorough cultivation as will help keep down all competing vegetation. There is a tendency among the growers to delay cultivation until so late that the soil moisture has been badly depleted. Not infrequently, the ground becomes too dry to work until another rain. This early depletion of moisture re-

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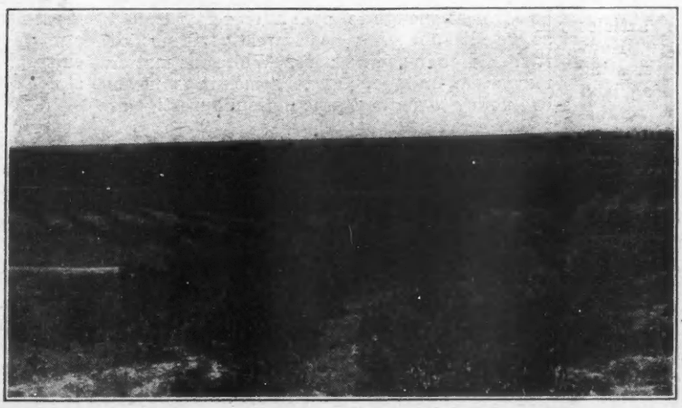

Scenes like this are rather common in the gently rolling land of central and southern Arkansas, where the highest quality peaches of the state are produced. Such views make it appear that the whole world is being planted to peaches

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A Trip Through Mexico and the Southwest

DURING the past month the Editor accompanied a group of agricultural editors on a tour through the great Southwest and old Mexico. The trip took us through Baton Rouge and New Orleans, La. In Texas, we stopped at Houston, Galveston, Corpus Christi, Kingsville and Brownsville. Stops were made in Mexico at Matamoras, Monterrey, El Manuel, Tampico, Celaya, Vera Cruz, El Hule, Mexico City, Hidalgo, San Luis Potosi, Aguascalientes and Torreon. After again reaching Texas, we stopped at Laredo, Catarina, San Antonio and College Station. At all the places named, we made side trips in automobiles or cars to points of interest.

The chief purpose of the trip was to enable the members of the American Agricultural Editors' Association to learn more about our own great Southwest by first hand contact and also to learn more about our sister nation to the south of the Rio Grande. While we studied these places particularly with reference to agriculture, we learned all we could of the social, economic and political conditions as well, for an agricultural editor, to properly fill his mission, must have as good an understanding as possible of such matters.

In the American Fruit Grower Magazine, we have heretofore confined the articles rather strictly to the fruit industry. However, the situation in Mexico is so interesting and so important just now, from agricultural and other standpoints, that we believe our readers will want us to go a little outside the strict field of fruit growing and give them information about this extremely interesting country. Accordingly, the Editor will present a series of articles in the next few months which will describe the trip through Mexico and our own Southwest.

An Unfortunate Speech

IN THE recent tour of agricultural editors through Mexico, our first step onto Mexican soil was made at Matamoras, which is just across the Rio Grande from Brownsville, Texas. At that place, we were entertained at a dinner by business men and farmers in and around Brownsville, where we had spent the day.

At the close of this dinner, a speech was given by R. B. Creager of Brownsville. Mr. Creager is Republican national committeeman for Texas. He is said to be quite close to President Coolidge; in fact, press reports state that he attended the breakfast conference held at the White House recently. In the Brownsville district, Mr. Creager is said to be an informant of the administration in matters pertaining to Mexico. He stated in his speech that he had just completed a trip to Mexico City and many other places we were to visit. Possibly he made this trip to gather information for the administration. Mr. Creager is a lawyer and has headquarters at Brownsville. He also maintains an office in Mexico City. The question arises as to whether he represents clients who are interested in the Mexican land situation.

Mr. Creager made some interesting remarks in his speech, but there were two features of it which were very much out of place. In the early part of his address, he cautioned the editors against allowing themselves to reach the conclusion that the American government had been at fault in its dealings with Mexico. Toward the close of his speech, he repeated the statement. Both times, he used the most emphatic language he employed throughout his address. He seemed to be quite anxious to drive the point home.

It is needless to say that the agricultural editors resented the statement. It was an insult to their intelligence. Apparently, Mr. Creager was unwilling to allow them to reach their own opinions of Mexico after a careful and unbiased study. Obviously, he desired to give them a prejudiced viewpoint in advance. The suggestion arose in the minds of a number of editors as to whether the remarks of Mr. Creager were inspired.

But the character of the remark itself was not the worst feature. Be it remembered that the remark was made on Mexican soil. We do not profess to be familiar with the facts of international law or with the ethics of diplomatic usage, but we do not see how the making of such a remark on Mexican soil by an American to a party of Americans can be justified from any standpoint. We wonder just what would happen if a Mexican should come over into Brownsville and make a similar remark, or if an Englishman should come to Chicago and speak in a similar way. Undoubtedly, he would receive front page publicity in all the big dailies, and our state department would make the matter a subject for an exchange of diplomatic notes.

Mr. Creager's remark was very much out of place, both as to what was said and where it was said. The incident was unfortunate, in our opinion, both from the standpoint of the administration and of the country at large. It does not add to the prestige of the United States in foreign countries for Americans to be careless enough to make such remarks, and as we all know, American prestige is not all it should be in some places. While the matter may seem unimportant to some, it is never bad policy to maintain the national prestige at the highest level possible.

Agricultural Statesmanship Needed

RURAL AMERICA needs an agricultural statesmanship that will help us not only to solve the economic problems of production and distribution, but to create a finer and fairer social order throughout rural America. The specialists have served and are serving well the farmer. The chemist, the bacteriologist, the agronomist, the entomologist, the plant pathologist, the mechanical engineer, and their fellow specialists have effected a revolution in the methods and the machinery of farming. The economist has turned his attention to the distribution of the products that these specialists have helped the farmer to create in greater and greater abundance.

The economist's work is far from completed. It will not be completed, in my judgment, until the farmers of America, through intelligent co-operative organization, have met and matched the grand scale organization of business and industry with a grand scale of organization of agriculture, until farmers as producers of marketable products no longer buy at retail and sell at wholesale, but stand on a par with other manufacturers in the conduct of their business.

Unless the economist helps the farmer to put agriculture on a par with other manufacturing enterprises, the day will come when the individual farmer will have to give way before a generation of great landowners who will bring a vast organizing genius to bear on agriculture and Fordize the farming of America.

But, beyond all these considerations, stands the even larger fact that agriculture is more than a business—it is a life. And we have, as yet, hardly approached the problem of creating throughout rural America a social order that will enable the sons and daughters of our farmers to satisfy to the full their economic, social, intellectual, and spiritual needs without emigrating to towns and cities.

One of the jobs of agricultural leadership is to remove some of the necessity for this ceaseless migration of competence to the cities. The agricultural leadership that helps toward this achievement will not only serve American farmers as a class but will strike a blow for a sounder civilization in general.—Glenn Frank, president, University of Wisconsin.

A Reasonable Viewpoint

IN A RECENT ISSUE, we called attention to the very material progress which has been made in the last few years in bringing about a more favorable attitude toward agriculture in this country on the part of business men, publishers and industrial interests. As we have stated, many of our leaders in business and industry have been big enough men to change their viewpoints from one extreme to the other regarding agriculture.

In this connection, it seems very much worth while to call attention to a statement which recently appeared in the New York Times. We do not mean to suggest that the New York Times has changed its viewpoint, for we have not followed its editorial columns consistently, and we do not know what its viewpoint on the agricultural situation has been. However, no matter what its viewpoint has been in the past, the statement we have reference to is particularly significant in view of the fact that the Times is published in our great banking center, where there seems to be a much greater lack of sympathy for the agricultural situation than there should be. The statement is as follows:

"It is not denied, the New York Times has never denied, that agriculture in this country has suffered by our fiscal system. Tariff protection for the farmer has been demonstrated to be an illusion. Prices of his staple products are fixed in world markets and not by customs duties levied on imports. While thus unable to avail himself of the government subsidy, which the protective tariff is in thin disguise, he has been compelled to pay artificial prices for many of the necessities of his occupation. That a rankling sense of injustice has in consequence been aroused in him is not unnatural. But he ought to see wherein lies his true remedy. This is not in seeking for himself government favoritism, but in striving to do away with it where it is unjustly enjoyed by others."

Handling the Orchard Soil

Part II—Some Common Systems of Orchard Culture

By J. H. Gourley
Ohio Agricultural Experiment Station

IN OUR last article, we discussed the effects of the various cultural treatments upon the soil itself, that is, their effects on soil temperature, moisture, nitrification and texture. At this time, we shall consider the various systems of culture in relation to the growth and yield of the trees; and in a future issue, the place of fertilizers in the orchard program will conclude the series.

Adaptation to Needs

That there are several methods of handling the orchard land in vogue is apparent to every observer, but in the final analysis, there are only two essentially different ones. One involves tillage or cropping of the land between the trees, and in the other, the land remains in some more or less permanent cover. The variations from these two are almost legion, and in some cases they merge so closely as to make it difficult to define them. Under some conditions, it makes little difference which one of several might be followed, for the natural conditions of soil and climate are so favorable as to permit of a range of choices with almost equal success. That sod with the proper use of fertilizers, legume sods without fertilizers, grass or sod mulch, tillage with cover crops, tillage with intercrops, and strip cultivation, are all used successfully with the apple in various places, the writer is aware. But there are other fruits and other places for which it makes a good deal of difference whether a system of tillage or one of sod culture is used. Failure has frequently followed the use of a wrong one. It is a clear case of the proverbial round peg in the square hole.

What orchards, for instance, do we see in an impoverished and dying condition as we travel through the country? As a rule, it is the ones standing in sod, unfertilized as well as unsprayed. On the other hand, there are large areas in which the winters are "open" and soil erosion is one of the greatest of curses. To cultivate such land with the meager cover crop that can be grown, is equally as injurious as sod is in some other places. So we must have a wider horizon than our own local community or even our state boundaries in passing judgment on the practices of our fellows.

Grass Versus Fruit

The growing of fruit trees in grass land or pastures was once the all but universal practice in the East. Now some definite system of culture is the rule in most commercial orchards. It is scarcely necessary to try to prove that growing trees in sod—sod neglect as it is sometimes called—is unprofitable. Yet despite the evidence that can be assembled on this point, we still can find sod orchards that are successful or reasonably so. Here we are thinking again of orchards in hill sections of the country where the sod is poor and where mulch material is next to impossible to obtain. Under such conditions, the grass growth beneath the trees is usually sparse, especially after the trees are large enough to shade the ground. By mowing the weeds, poverty grass and other grasses that occur, and by heavy fertilization, together with a proper spray program, satisfactory crops are usually secured. Such trees are usually smaller and the production is more likely to be biennial, than when a better soil treatment is followed. This is probably as simplified a procedure as can be followed and still avoid the serious results of sod grown trees. Two conditions are met which account for this partial success. One is the sparse growth beneath the trees which obviates the depressing effect on nitrification which occurs in a heavy sod, and the other is that nitrogen, that key factor in orchard fertilization, is amply provided for in the chemicals that are used. However, nothing is done to conserve moisture or make the soil more retentive of it, and in dry seasons, such as occurred two years ago, serious injury may occur.

We are not trying to make a case for sod but simply cite what is actually being done in some sections. Now let us consider briefly the other side of the picture. As pointed out in our previous article, practically all investigations have shown that soil nitrates are at a low ebb throughout the growing season under blue grass, timothy, and other grasses. Moisture may or may not be a limiting factor. There are many orchards growing in sod where the land is rich in comparison with those described above and where moisture is ample for a vigorous growth of grass. When fertilizers or manures are added year after year, this grass becomes so long and matted that nitrogenous fertilizers fail to overcome the detrimental effects of the grass. In such cases, it is practically necessary to destroy or discourage the grass before recovery of the trees can be expected. This may be done by plowing the entire orchard, or by thoroughly disking up and down the tree rows with a heavy tractor outfit, or by smothering the grass by mulching. So our main argument would be that sod is usually detrimental to the orchard but less so under some conditions than others, as illustrated in the two cases above cited. Certainly, young orchards of all kinds should be cultivated when possible, and peaches, plums and cherries should be continuously in tillage except where legume covers can be provided, and then less commonly than the apple.

At the left is shown a good stand of hairy vetch; on the right, a stand of purple vetch from California winter killed

A typical commercial orchard in the straw or grass mulch

The Mulch System of Orcharding

The mulching of orchards has had many opponents as well as strong adherents during the past quarter century. The opponents feel that it is little better than sod and that it involves several hazards that the orchardist cannot afford to take along with the natural hazards of the industry. But while the debate has waged during all these years, the mulch men have continued to do business in a perfectly successful way, and new converts are added from time to time as the expense of cultivation mounts with the increase in labor costs. On the other hand, some mulched orchards have been plowed or disked when mice injury became serious, or when the apple flea weevil made a determined stand, or for some other good reason. In other words, neither side has been shown to be wrong, and neither side has won a victory over the other. So long as either system can be made to work successfully if operated under the conditions for which it is adapted, why should there be any serious controversy? As a matter of fact, the mulch has a wider use than was first proposed for it, for there is probably a greater proportion of well-mulched orchards in the

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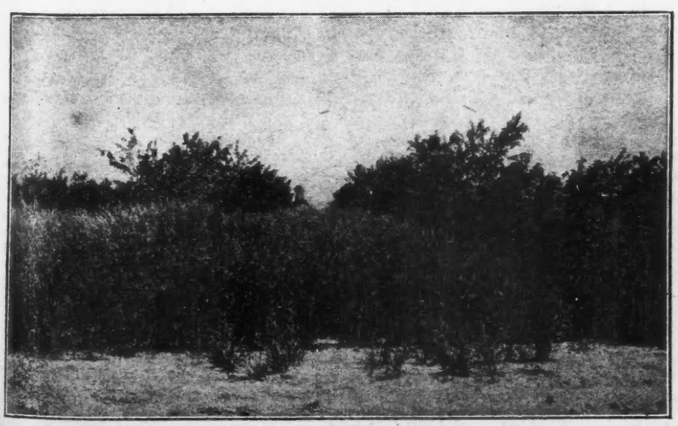
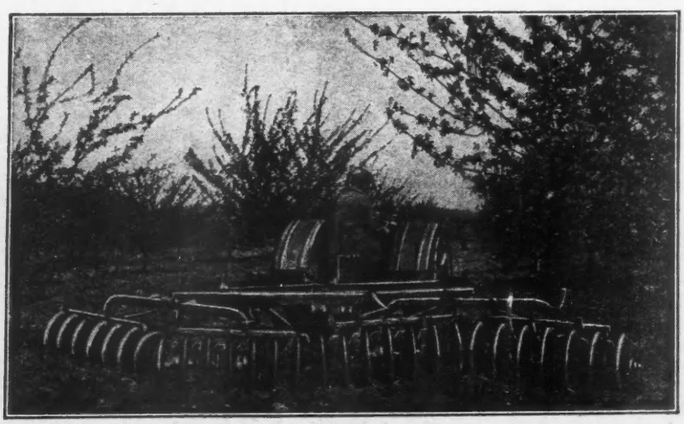


This crop of rye should have been plowed under when half this size



A modern tractor at work in the orchard of C. A. Bingham, Cleveland, Ohio

Nitrogen Fertilizers in Peach Orchards

By Chester A. Taube

IT IS a recognized fact by those who are interested in growing peaches that the trees remove various amounts of plant food from the soil for their growth and production of fruit and that eventually there will be an inadequate supply of some of these food elements unless they are restored to the soil in some form.

The following table, taken from the book, "Peach Growing" by H. P. Gould, shows the approximate amounts of plant food taken up in one year by a mature bearing peach tree, and by an acre of 108 trees:

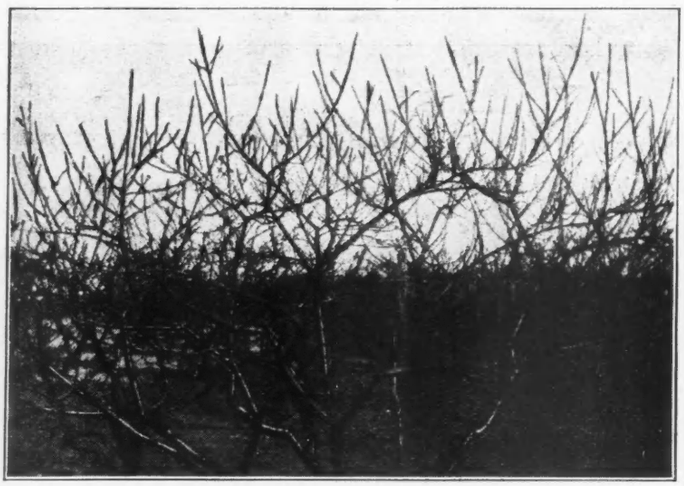
Plant-food.	Amount taken by one tree. Lb.	Amount required by one acre. Lb.	Ratio based on one pound of nitrogen.
Nitrogen ...	0 63	68	1.00
Phosphoric acid	0.14	15	0.25
Potash	0 60	65	1.00
Lime	0.95	102	1.50
Magnesia ...	0.30	32	0.50

The elements iron and sulphur are not shown in the table, perhaps because, although they are essential, the amounts taken up by the tree are comparatively small. The other three which make up the 10 essential elements for plant growth are carbon, hydrogen and oxygen, which the tree obtains in large quantities from the air and water and which make up the largest part of the tree.

Nitrogen is Usually the Limiting Element

These 10 food elements are supplied in sufficient amounts for plant growth, with the exception of nitrogen, phosphoric acid and potash. Many experiments carried on for a number of years in different peach sections tend to show that of these three elements, nitrogen is the one of greatest importance. Large quantities of phosphoric acid and potash are taken up by the tree, but there seems to be an adequate supply of these two elements in the soil as far as peach culture is concerned. To say, however, that the application of fertilizers containing these two elements is unnecessary would be making a broad statement. Beneficial results are obtained from them when other crops are interplanted in the orchard before it reaches the bearing age, and in other cases cover crops have responded to them.

Some experiments seem to indicate that the trees themselves have been benefited by their application, but the results have not been nearly so noticeable as have resulted from the nitrogen applications. In a circular issued by the Missouri College of Agriculture, H. D. Hooker makes these statements regarding the use of phosphates and potash in Missouri: "For ..nc easing the growth and yield of trees, no other fertilizer is likely to be so effective as some quickly available form of nitrogen. So-called complete fertilizers are sometimes recommended for orchard trees on the basis that nitrogen promotes growth, that phosphates increase fruit production and that potash improves color. Experimental evidence that either phosphates or potash have these desirable qualities or that they benefit fruit plants in any direct manner is, however, entirely wanting." Assuming that phosphates and potash may be effective in so.. ases, I will disregard them at this time and consider nitrogen separately in relation to peach culture.



Top of a 15-year-old Elberta peach tree showing vigorous growth resulting from use of three pounds of sulphate of ammonia

Nitrogen Brings Quick Results

The application of nitrogen in some form to the soil requires a comparatively short time to bring about noticeable results. The foliage is thicker, darker and larger; the tree has a healthy appearance; and it is obvious to the observer that the tree is functioning properly. Thus, the tree has taken up and utilized the nitrogen and has built from it a large, healthy leaf area, the part of the tree that manufactures all of the food used by it for various purposes. The nitrogen in causing a large leaf area to be constructed has probably played its most important part, and the results which are obtained from then on are determined more or less by the leaves. Just how the nitrogen is taken up by the tree may be of some importance.

All nitrogen taken up from the soil by the root system of a tree must be in solution and in an available form known as nitrates, and any nitrogenous fertilizer applied to the soil must be changed to nitrates, unless the fertilizer is already in that form, as is the case with nitrate of soda. This process of changing the nitrogen into an available form is called nitrification and is directly due to small germs known as nitrifying bacteria. These bacteria are most active in soils in good physical condition, from the time the soil warms up in the spring to late summer.

Leaves Manufacture Food

The process by which the leaves manufacture food is known as photosynthesis. Suffice it to say that the leaves obtain water and food elements from the soil and carbon from the air in the form of carbon dioxide. These meet in minute green structures in the

(*Continued on page 24*)

How Trees Use Water

By A. H. Hendrickson

University of California

DROUGHT during the growing season is a condition as greatly to be feared by the fruit grower perhaps as any of the other unfavorable climatic conditions. In many cases, its effects are severe enough to damage the growing crop and also injure the fruit buds for the following year. Reports of damage due to exceptionally cold winter temperatures, to cold wet weather at blossoming time, or to unusually severe outbreaks of fungous diseases or insect enemies, are so common that they need no further mention in this paper. Upon moisture conditions of the soil and of the air depend to a large extent, during some seasons at least, that elusive property of fruit usually called "quality." Protracted rains with attendant cloudy weather, or the other extreme, which often brings about drought, both have their effect on the product harvested. As these effects seem to be directly or indirectly dependent on water, it might be well to inquire into some of the questions which have become well known under the term "water relations."

Plants Transpire or Give Off Water

It is well known to every student of elementary botany that plants and trees transpire or give off water. This transpiration takes place chiefly from the leaves, fruits and succulent young growth. It goes on to a greater or less extent throughout the year, but is most rapid during the daylight hours of the growing season. Reduced to its simplest terms, transpiration is essentially evaporation from leaves and unprotected parts of the plant. The source of the water given off by plants is moisture held in the soil. Water is brought by the extensive root system to the trunk, or stem and then distributed to the leaves, where it passes off as water vapor.

Transpiration was one of the earliest observed natural phenomena of plants. It has received a great deal of attention by plant workers, from the experimental as well as the practical points of view. One of the earliest facts ascertained regarding transpiration was that plants give off a great amount of water during the growing season. Hence, it will be readily understood how important this subject is to fruit growers in the semi-arid regions, where water must be brought to the trees by costly irrigation structures. Any knowledge which will help the grower to better understand the use of water by plants seems to be worth the seeking.

Must Understand Structure of Leaf

To understand how transpiration takes place, it is necessary to know something about the structure of a leaf. With the ordinary deciduous fruits, there are to be found on the under surface of the leaves thousands of minute openings known as stomata. These openings are opened and closed by two bean-shaped cells known as guard cells. Immediately inside of the guard cells and connected with the outside air when the stomata are open, is a chamber. Into this chamber evaporation takes place from the unprotected adjacent cells. The water vapor given off by these cells then passes out of the stomatal opening into the outside air.

The guard cells are so constituted that they normally open in response to light and close with darkness. They also close in response to other stimuli, as will be shown later in this paper. On a clear summer day, the stomata open shortly after daylight, and the process of transpiration begins to go on rapidly. As the cells in the leaves lose water, more water moves in from the adjoining water-conducting tissue of the plant. In turn, more water moves up the stem from the roots to replace the loss from the leaves.

This description tells briefly how the process goes on for a short time very early in the day, but other complications soon enter which make the process more intricate than it would seem. The first complication, at least as far as the leaves of many plants are concerned, is that the

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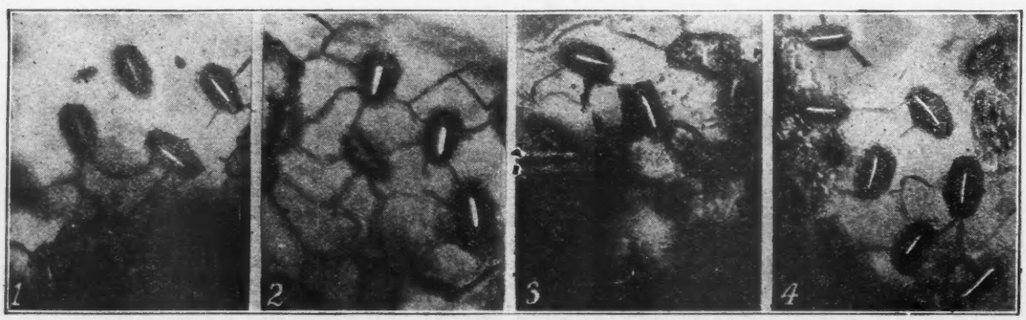

Figure 1.—Prune stomata on irrigated tree shortly after daylight, showing width of openings. Figure 2.—Prune stomata on irrigated tree at 10 a. m., showing maximum openings. After this hour the stomata began to close. Figure 3.—Prune stomata on irrigated tree at 6 p. m. Figure 4.—Prune stomata on tree in soil having practically no available moisture in root zone. This photo-micrograph shows the maximum opening shortly before noon. The stomatal openings were about as wide as the openings on leaves of the tree in moist soil at 6 a. m. See Figure 1. (In all cases the stomata are greatly enlarged)

GRAHAM BROTHERS TRUCKS

Yearly sales of Graham Brothers Trucks and Commercial Cars (formerly known as Dodge Brothers Commercial Cars) are shown in the table below. It begins with 1921 and goes through 1926.

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Cherry Industry in Door County, Wisconsin

By D. E. Bingham

THE CHERRY INDUSTRY of Door county dates back to 1895. The first cherry trees were planted in 1893 by A. L. Hatch, who, in co-partnership with E. S. Goff of the University of Wisconsin Department of Horticulture, had purchased 80 acres of land in Door county to be used in fruit growing. The main object of this venture was plum culture. After some investigation, it was assumed that the plum curculio had not as yet gotten across the ship canal which makes the northern part of Door county an island. This, however, proved not to be the case, as curculio were present in abundance and did no little damage in the following year that the plum venture endured.

It was not the curculio alone, however, that terminated the plum venture—you all probably know the climatic conditions necessary for European and Japanese varieties of plums. Even the climatic conditions were only partially the cause af abandoning plum culture on any scale commercially.

Several Varieties of Cherries Planted

With the 16 acres of European and Japanese plums there were planted several varieties of sour cherries, including English Morello, Wragg, Early Richmond, Montmorency and several of the Dukes and Biggareanes. Of course, the Dukes and Biggareanes were a failure, and the Wragg and Morello were only partially successful.

I came into the game in 1895 as manager for the Hatch, Bingham and Goff holdings, and in the spring of 1896 planted three more acres of cherries on new pine land, fresh stumped and cleared of second growth pine, poplar, etc. Anyone familiar with the geology of Door county knows the conditions for fruit growing which exist there. For those who do not know, it may be well to state that the western side of the peninsula is largely pine land, the eastern half hardwood. On the west side, the limestone crops out quite frequently; the eastern portion in many places has shallow soil and in many places is not as well drained as is the west side. It was known, of course, that well drained soil was much better suited for tree culture, and it was the west portion of the county that received the attention of persons interested in fruit growing.

It was in 1895, as I stated, when planting began. We were interested in the nursery business, working hard to get plantings started, but it was uphill business. A demonstration was necessary and that was not yet forthcoming. Our salesmanship, however, induced several to buy trees and set out a few acres. In those days, the idea of acclimated nursery stock was rampant, and many feared that southern grown cherry trees would not do; but by showing trees planted and doing well, the suspicions of the skeptical were quieted to some extent and some planting was done.

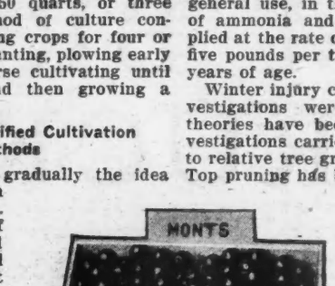
Interest Became General in 1910

But not until 1910 did interest in cherry growing seem to occupy the minds of more than a few. In the fall of 1909, some land changed hands and a corporation was formed. Forty acres of cherries were planted by this corporation in the spring of 1910. That same spring, about 26,000 trees were purchased for the planting of another larger tract, which later developed into the 600-acre orchard known for years as the Co-operative Orchard Company but now known as the Martin Orchards. The first corporation was known as the Sturgeon Bay Orchard and Nursery Company. Being the manager of this company, I furnished many thousand trees and supervised the planting of several thousand acres of cherries and apples in Door county.

In those days, teams of horses and mules did our cultivating. During the period from 1902 to 1914, some wonderful crops of cherries were produced—3500 cases from five acres, 100 trees to the acre, 10, 11 and 12 years old. Six-year-old trees produced in the neighborhood of 50 quarts, or three crates. Our method of culture consisted in cultivating crops for four or five years after planting, plowing early in the spring, horse cultivating until about July 1, and then growing a weed cover crop.

Tractor Intensified Cultivation Methods

There came in gradually the idea of more thorough stirring of the soil. With the advent of the tractor and heavier tools and the ability to get over more land, cultural practices became intensified. The land received eight or 10 cultivations per year, and the humus began to give out. Stable manure was either at a premium or there was none to be had. Horses were replaced with tractors, which reduced the farm manure pile.



Crate of well finished Montmorency cherries

Winter injury to buds began to be evident. Early Richmonds failed to come through; Montmorencies had a heavy June drop; low lands began to be drained more definitely; and trees showed considerable root injury from year to year. The mistakes in pruning began to show up and wiring was resorted to extensively in many orchards to prevent the trees from breaking down. Sun or winter splitting on the southwest side of the tree was quite noticeable in places. Some orchardists beat nature to it in the matter of this winter checking by slitting the bark on the southwest side of the trunk where nature would put the crack if she did put it anywhere on that tree, and painting the slit with white lead.

Cultivation Reduced Humus Supply

Now, as I have said, the supply of humus got low as cultivation became more intensive. Winter injury to buds was more frequent—and all the rest of the sad story. But right at this time commercial fertilizers came into general use, in the forms of sulphate of ammonia and nitrate of soda applied at the rate of two and one-half to five pounds per tree to trees 12 to 14 years of age.

Winter injury continued, and bud investigations were numerous. Some theories have been advanced and investigations carried on with reference to relative tree growth and bud injury. Top pruning has been carried on with varying degrees of severity with continued cultivation, fall cultivation, deep culture and shallow culture, but bud injury seems to be about the same. Elevation has been found to be of some consequence, but what is the solution?

Do Trees Need Constant Culture?

The theory has been advanced that cherry trees need constant yearly culture more than other fruit trees. Do they? If so, how can we supply humus and plant food? With commercial fertilizers and cover crops, some say. Can we supply sufficient humus for any orchard and cultivate every year? I am inclined to think we cannot. Isn't there danger of too deep cultivation too late? I think there is. It seems to me there is danger of distributing feeding roots with heavy tractor-drawn harrows set too deep. Early cultivation can, of course, be deeper than later cultivations in the average season.

Some orchardists, I fear, in the use of cover crops and soiling crops, look only at the growth above ground, especially of the legumes. For several years, the clovers have had the attention of some of the orchardists in Door county. Some who are strong advocates of Hubam clover as a cover crop, think that fills the bill. It is better than pigweed perhaps, but after several years' experience, I feel that it is very much over-estimated. White blossom sweet clover has it beat a mile or more.

What Is the Solution

What is the solution to this cherry culture problem? Do cherries need yearly cultivation? Must we cultivate cherries and get the aeration and looseness of the soil with that method or can we stop cultivation one season, grow one or two cuttings of sweet clover and keep the trees in excellent condition? I am sure of one thing. We had excellent foliage and growth this year after no cultivation and a good crop of sweet clover last season. And the reason was one of the driest seasons Door county has had in the 31 years I have been there.

It will take several years yet, of course, to prove the theory, unless someone here has had a few more years of experience. What will the answer be?

Vegetative Matter Is Important

It seems to me the answer is more vegetable matter in the soil with more shade on the ground during the growing season, not entirely for the benefit of the tree, but to conserve humus and keep the supply normal. So many times in our country and as I have driven over different roads, I have noticed orchards as clean as a garden. I have wondered if the condition came about from years of experience or from a desire to be, in the eyes of the tourist, the most thrifty farmer in that neighborhood. This, I know, enters the minds of many orchadists, for, as I drive along the roads, I notice fine growing trees with the body entering nice clean dirt, and not a weed to be seen. But by a little closer observation, you would often find that this method extended only to the third row back, and if you were to stop and explore a little, you would find on the back edges of many such dressed-up orchards a few brush piles, sod in a three to six-foot circle around the trees, and less evidence of cultivation. Has anyone noticed any particular difference in the yield or size of the fruit?

Now, I am not condemning the dress-up part of fruit farming, nor am I favoring slack, shiftless methods. Many times I have heard tourists say, "There is a good farmer, see how clean his orchard is." They will not make such a statement about my orchard, however.

Is this method best for the orchard? I have 160 acres of orchard that never had a forkful of stable manure since it was planted, and 120 acres of this 160 *never* had a forkful of manure and never has had more than two or three years of real clean culture; but it has been cultivated 10 out of 15 years early in the spring, and five or six crops of clover, mostly sweet clover, have been left on the land.

Use Deep Culture Early if At All

I feel that if deep culture is wanted at all, it should be practiced very early before growth starts, and if continued culture is practiced, it should be much shallower than the first, and then continue shallow. Under this method, we have produced an annual growth of 12 to 14 inches and fruit of very good size and color, with about the same production during the last four years.

We found nothing that would put the color and size in the foliage until we began using sweet clover and put into the soil an abundance of humus. Forget you are on a public highway, cast your eye more towards the color and size of the foliage on the tree, rather than toward what is growing under the tree. Keep plenty of humus in the soil for three or four years and note results. Know when to stop feeding and when and how to feed.

Humus Improved Soil

Soil full of humus will remain soft and friable after heavy rains. In soils void of humus, the grains run together when it rains and the soil bakes and

(Concluded on page 30)

Picking scene in the cherry orchards of the author

Ringing Loafer Apple Trees

By C. L. Burkholder, Purdue University

THE OLDEST literature on the subject of apple growing discusses methods of pruning which were supposed to make the trees more fruitful. Some of our present commercial varieties of fruit, such as the Black Twig, Northern Spy and Baldwin, are very slow to come into bearing. Any practice which would hasten the fruitful period of such varieties or any others with that tendency would be welcomed.

For the past several years, the Ohio Experiment Station has been experimenting with girdling in a young Baldwin orchard, and so far the results have indicated a much increased yield with little injury to any of the trees. The trees worked on were about 10 years old and were in a vigorous, unfruitful condition. About one-third of the main scaffold branches on each tree were girdled three or four weeks after bloom. A strip of bark one-quarter inch wide was removed completely around the limb near the crotch, and the wound was immediately covered with tire tape or waxed strips of cloth.

The ringed limbs averaged better than one bushel of fruit apiece, while the unringed portions of the tree produced neither blossoms nor fruit. It is important to cover the ringed areas as soon as the work is done and to see to it that the tape or cloth does not push down against the bottom of the cut. It is also best to ring not more than half the scaffold limbs of each tree any one season. This work is still in the experimental stage, but the method is well worth trying in a small way by any grower having this type of trees in his orchard.

Orchard Cultivation

THE ORCHARD, the same as any other crop, requires cultivation, particularly during the spring. The young orchard especially should be given careful and thorough cultivation. In orchards planted on steep hillsides, cultivation is not possible or advisable, due to the tendency of the soil to wash, but in all other cases some cultivation is recommended.

Cultivation serves the purpose of conserving moisture and keeping down weeds, so the number of cultivations will depend upon the amount of moisture and weed growth. If a cover crop is to follow cultivation, two or three cultivations will be sufficient, beginning as soon as the soil becomes workable in the spring.

Deep plowing in an orchard is not advisable, especially in older orchards, because of the danger of injury to the roots. Any method that will break the crust and form a dust mulch is satisfactory. This mulch is necessary for the conservation of moisture.

Either a disk or spring-tooth harrow will do very good work in keeping a mulch and keeping down the weeds.

Besides conserving moisture and keeping down weeds, cultivation tends to break up the harbors of mice, add plant food to the soil, and make more available the plant food already in the soil.

The young orchard should be kept clean cultivated the first part of the season and a cover crop sown later on. This cover crop, on being turned under, will add organic matter and plant food to the soil and assist in obtaining good growth. Strong growth in the young tree is very essential.—*Virginia Extension Division News.*

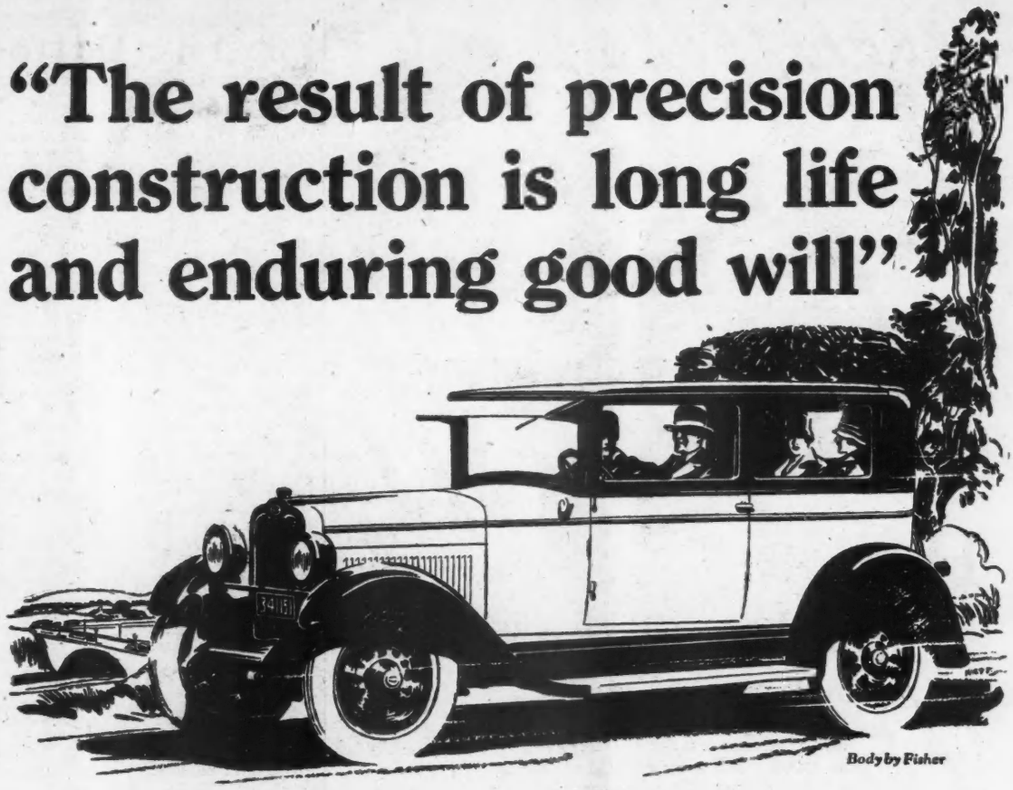
Extension Circular on Strawberry Culture

STRAWBERRIES may be grown on any soil suitable for ordinary farm crops, but most varieties do better on light sandy or gravelly loams than on clay soils, according to C. Woolsey, extension horticulturist, College of Agriculture, University of Arkansas. Woolsey points out in Extension Circular 104 on "Strawberry Culture" that new lands produce good yields because of the abundant supply of organic matter.

"Crops planted on old soils usually cost a little more the first year, but with proper fertilization and good cultivation should make good yields. A light sandy soil with a southern exposure will retard the early fruit, while a heavy, moist soil with a northern exposure will retard the early spring growth and produce later fruit. Low lands should never be planted to strawberries as they are more liable to frost injury than on higher places with good air drainage."

This circular has just been revised and includes information on preparation of the soil, fertilizers, planting and training, cultivation, mulching, harvesting, and varieties. It may be had free by writing the Extension Service, College of Agriculture, University of Arkansas, Little Rock.

"The result of precision construction is long life and enduring good will"



Body by Fisher

So much has been said and written about the standards of accuracy to which the Greater Oakland Six is built that "Oakland super-precision" has become almost an everyday phrase.

Owners, in discussing the car's flashing acceleration and buoyant smoothness . . . mechanics, when explaining the why of its infrequent repairs and adjustments—

—and even women, when exclaiming over Oakland's steadiness and steering ease—sooner or later use the words "super-precision," or others very similar. But we wonder, sometimes, if the users of that phrase really appreciate its profound significance. Do they know that in the manufacture of the the Oakland engine alone, eighteen operations are held to limits of five ten-thousandths of an inch? That *thirty-three additional* operations cannot vary more than three ten-thousandths of an inch? And that three ten-thousandths of an inch is one thirtieth the thickness of an average human hair?

Yet, after all, what if they do not know it? What if they do not even care that Oakland has invested millions for laboratories and equipment to make such accuracy possible for the first time in a car of Oakland's price?

All they are concerned with is results . . . the result of precision construction, which is long life and flawless operation . . . the result of rigidly controlled quality, which is lasting owners satisfaction . . . the result of enduring value, which is Oakland's enduring good will!

SEDAN $1095

Oakland Six, $1025 to $1295. The New and Finer Pontiac Six, $775 to $975. Pontiac Six Commercial Cars, $585 to $770. All prices at factory. Delivered prices include minimum handling charges. Easy to pay on the General Motors Time Payment Plan.

OAKLAND MOTOR CAR COMPANY, PONTIAC, MICHIGAN

The Greater OAKLAND SIX

PRODUCT OF GENERAL MOTORS WINNING AND HOLDING GOOD WILL

Subtropical School of Agriculture

FOR THE benefit of high school teachers in agriculture and students in colleges of agriculture, the College of Agriculture of the University of California will again conduct a summer school in subtropical horticulture this year. The school will be conducted at the Citrus Experiment Station at Riverside, which is in one of the leading citrus sections of California. The course will continue for six weeks, or between June 25 and August 6.

The course is designed primarily for students who desire to take the course for credit. However, it is also open to students and fruit growers of other states who will pay the usual auditor's fee.

A strong teaching staff will give the courses. Special lectures will be given upon all the phases of subtropical fruit problems. Four different courses will be given, as follows: (1) The Citrus Fruits; (2) Subtropical Fruits of Lesser Importance in California; (3) Diseases Affecting the Subtropical Fruit; and (4) Insects Affecting Subtropical Fruits.

Those who desire more detailed information can obtain the same by writing the College of Agriculture, Berkeley, Calif.

Hot sparks—*instantly!*

EVEREADY Columbia Dry Batteries shoot hot, vigorous sparks to the engine for a quick start and a steady run. They supply the same sure-fire ignition at any speed. No continued cranking to get going. Bang! goes the engine on the first turn-over.

Reliable battery ignition cuts corners on the first cost and on the upkeep of farm engines. Ignition repairs and renewals are few and far between if you use Eveready Columbia Hot Shots in their water-proof steel cases. Install them, and no matter how heavy the rain or how wet your engine or battery is, starting is easy and the engine keeps on working until the job's done.

National Carbon Co., Inc.
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EVEREADY COLUMBIA Dry Batteries
-they last longer

Poor Apple Varieties Should Be Topworked

BECAUSE of the advisability of reducing the number of varieties of apples grown in New Jersey, growers will find it to their advantage to topgraft worthless varieties to desirable kinds, says the Department of Pomology at the New Jersey College of Agriculture.

Numerous odd and unprofitable sorts are grown in the state, many of which should be removed entirely, while others could be profitably topworked to standard varieties which are well adapted for market production.

Topworking may be done successfully on trees less than 25 years old, provided the following precautions are observed: the trees should be healthy and not headed too high; the scaffold limbs should be suitably located so that a desirable shape will result after grafting; scions should be taken from well-matured terminal shoots or water sprouts.

With trees that are not more than five or six years old, all the new grafts may be inserted at one time. However, with older trees it is often preferable to spend two or three years cutting away only part of the leaf bearing surface at one time and thereby insuring proper development of the grafts and the rest of the tree.

Copies of Circular 158, which describes the various methods of topgrafting, may be had by addressing the Mailing Clerk, New Jersey Agricultural Experiment Station, New Brunswick, N. J.

Japanese Beetle Quarantine Regulations Revised

REVISED regulations under the Japanese beetle quarantine became effective April 1. No change was made in the quarantine law. The principal purpose of the revision was to include in the regulations supplemental regulations which have heretofore been included in an appendix. The revised form should eliminate some of the difficulty and confusion which have been experienced.

The articles which are restricted in interstate movement by the quarantine are as follows: (1) farm, garden and orchard products of all kinds; (2) grain and forage crops of all kinds; (3) nursery, ornamental and greenhouse stocks, and all other plants; and (4) sand, soil, earth, peat, compost and manure.

Persons interested in the shipment of any of these articles should make careful study of the restrictions before shipping the same.

The quarantine applies to all of New Jersey and portions of New York, Connecticut, Delaware and Pennsylvania.

The Editor's Mail Box

Raspberry Mosaic

Editor, AMERICAN FRUIT GROWER MAGAZINE: Raspberry growing is new to me, and I would like to know what mosaic looks like and what it does to the plants. I understand it is found mostly in red raspberry fields. Your advice will be appreciated.—H. J. K., Indiana.

ANSWER: Raspberry mosaic is somewhat difficult to describe. It attacks the stems and leaves, although it is most evident on the leaves. The leaflets develop dark green, irregular raised patches which give the leaflets a mottled appearance. The leaflets remind one somewhat of a melon leaf attacked by aphids. The leaflets are usually smaller and the plants are smaller in general when the mosaic is present. The stems are inclined to be short and thin. The plants in general present a weakened and dwarfed appearance. Mosaic attacks both red and black raspberries.

I suggest that you read the article on page seven of our February issue. This will give you a more detailed description. If you want to see a good picture of raspberry mosaic, send to the Illinois Agricultural Experiment Station, Urbana, Ill., for a copy of Circular 305.

Killing Wild Onions

Editor, AMERICAN FRUIT GROWER MAGAZINE: In your April issue, you state that poison ivy can be killed by spraying it with arsenite of soda. Can wild onions be killed in the same manner? If not, how can a farm be relieved of this pest?—W. A. P., Kentucky.

ANSWER: Unfortunately arsenite of soda cannot be used for killing wild onions under general farm conditions. This material is quite poisonous, and it would destroy all other vegetation as well as the wild onions and would interfere with the growth of plants in general on the soil for some time.

The Department of Agriculture recommends plowing uninfested land deeply, late in the fall when the tops are a foot or more high. Take care to turn the tops under thoroughly. The following spring plant a cultivated crop. Corn in check rows is probably best. Keep down all growth of the onions. If any of the onions are left the following fall, repeat the treatment. Plowing in the late fall catches the onions when most of the strength is in the tops, and under such conditions the weed is more readily killed than at any other time, provided the plowing is followed by clean cultivation and the planting of a cultivated crop.

Experiments in Indiana indicate that wild onions can be destroyed by spraying with orchard heating oil. The plants should be sprayed in the tender leaf stage and before they begin to form heads. In southern Indiana, the best time under normal conditions is between April 15 and May 1. Spraying at a later time when the plants are heading out is practically useless. Spray thoroughly so as to cover all the plants. About 75 gallons of oil are required to the acre. The oil will kill other plants as well as the onions. Do not disturb the field until the bulbs are thoroughly rotted after spraying. This may require two or three weeks. After that time the ground can be broken and planted to corn or some other late crop. The best results from spraying with heating oil are obtained when the onions are thoroughly plowed under the fall before the spraying is done.

The Buffalo Tree Hopper

Editor, AMERICAN FRUIT GROWER MAGAZINE: I am trying to eradicate the Buffalo tree hopper, and I should appreciate it if you will tell me what green manuring crop I can plant which the nymphs of the tree hopper will not feed on. How about buckwheat or barley?—R. L. S., Connecticut.

ANSWER: I regret to advise that I have found no information in my files which will fully answer your question.

The injury by Buffalo tree hoppers is done, of course, by the adults, which make slits in the bark of twigs in late summer and fall and lay their eggs therein. The twigs and branches are thus weakened and some of them die.

In the spring of the year, the nymphs which hatch from the eggs live on grasses or weeds near the affected trees. No method has been devised for controlling this insect by spraying. The principal method of control consists in keeping the orchard clean cultivated during the spring and early summer months. Also, the boarders around the orchard should be burned over or cultivated in June. Such treatment will destroy a large percentage of the nymphs.

Continued cultivation, however, is inadvisable in any orchard. It seems to me that if you keep the orchard clean cultivated until July and then sow a cover crop, you will be able to keep this insect in check and still maintain a sufficient amount of organic matter in the soil.

I do not have any information as to cover crops which the tree hoppers will not feed on, provided there are such.

EDITOR'S NOTE: If any reader has learned of any cover crops upon which the nymphs of the Buffalo tree hopper will not feed, we shall be pleased to know of the same.

Says Bees Do Not Damage Sound Fruit

Editor, AMERICAN FRUIT GROWER MAGAZINE: My attention has been called to an article by Oscar H. Roesner in your March issue entitled, "Too Many Busy Bees." The author states that fruit in certain foothill sections of California has been damaged by bees due to a shortage of other food.

The author could not have been fully informed on bees or he would not have made such a statement. This proposition has been tested out in the courts and the bees have been exonerated in every case.

It is admitted that bees will work on over-ripe fruits when the skin has bursted, exposing the juices. They will likewise work on fruit that has been injured by birds or insects. Bees have no cutting jaws, as is shown by the microscope. Sound fruit can be put into any strong colony in a starving condition, and the bees will actually starve to death, because it is physically impossible for them to cut through the skin of the fruit. But if a puncture is made through the skin, the bees will suck out the juices, and the fruit will shrivel.

Our contention is that bees never injure sound or marketable fruit. Fruit that is over-ripe or which has been injured through picking or handling will be attacked, but such fruit would spoil in a short time. Any damage that the bees might do in such cases may be considered negligible. As to whether there may be too many bees for the blossoms, in most cases there are too few to do the work of pollination properly. If the legislature of California should pass a law such as indicated by Mr. Roesner, it would be a case of "killing the goose that lays the golden egg."

The AMERICAN FRUIT GROWER MAGAZINE has always been a warm friend of the bees, and we cannot believe that you will allow the statements of Mr. Roesner to go unchallenged.—E. R. Root, Editor, *Gleanings in Bee Culture*, Medinah, Ohio.

ANSWER: We appreciate your kindness in writing us regarding the article by Mr. Roesner. I am sure that fruit growers in general will be interested in your viewpoint on this question.

Killing Ivy in a State Park

Editor, AMERICAN FRUIT GROWER MAGAZINE: We have a state park in which poison ivy is a problem. We have been figuring on using goats to kill it. The trouble is that the goats will kill other vegetation as well.

Does the arsenite of soda which you mentioned in the April issue kill other grass and shrubs as well? I shall be pleased to have your advice on the matter. —R. P. W., Pennsylvania.

ANSWER: You cannot use arsenite of soda for killing poison ivy in a park, for it would kill grass and shrubs as well as the ivy, and it would prevent the growth of other plants on the soil for some time.

I believe you can destroy the ivy by spraying it repeatedly with salt solution containing three pounds of salt to a gallon of water. I suggest that you use a fine nozzle and spray

sufficiently thorough to wet all the ivy plants but not heavily enough to wet the soil and other plants unduly. This treatment will destroy the ivy leaves. After a new set of leaves begins to come out and before they have attained any appreciable size, spray them again. Continued treatment of this kind will kill the ivy, and it should not have any bad effect on the grass. The salt may kill back the grass a little, but it will sprout out again from the roots. The small quantity of salt used should not have any residual effect on the grass.

You should be able also to destroy the ivy by keeping the grass cut short and by persistently cutting out the plants below the ground.

Probably Black Root Rot

EDITOR, AMERICAN FRUIT GROWER MAGAZINE: Please tell me what was wrong with an apple tree I dug out of the ground today. It was a four-year-old Winter Banana. It looked healthy last year and had a few apples on it. I noticed today that the ends of the limbs had a shrivelled and dying appearance. On digging around the tree, I found that most of the roots were dead and part of the trunk also. The trunk under the ground and the roots were blackened, while the trunk above the ground was clean and bright. Some of my other trees have the same appearance.—H. M., Arkansas.

ANSWER: It is possible that the tree may have had black root rot. Trees infected with this disease often behave in the manner you describe. The best thing to do is to remove infected trees, root and all. The ground should be cultivated for several years before replanting. In the meantime, occasional deep digging of the ground where the tree stood and exposure of the ground to the sun will do much to rid the ground of the disease.

The disease also lives on dead forest tree stumps, as well as fruit trees. Therefore, it is advisable to remove and burn all dead stumps in the vicinity of the orchard.

Says Jujube Will Stand Zero Weather

Editor, AMERICAN FRUIT GROWER MAGAZINE: In the April issue, I noticed a letter from Mr. Lanham in which he stated that he doubts if the jujube will grow where the temperature falls below zero.

We have had plants of the jujube growing on the station grounds at Lincoln for six or eight years. These seem perfectly hardy, and for the last few years they have been producing fruit almost every year. There are two or three varieties among the trees we have, but we do not know the exact variety names.

It occurred to me this information might be of interest to your readers in view of the publicity which the jujube has been receiving.—*C. C. Wiggans, University of Nebraska, Lincoln.*

Culture of Dewberries

Editor, AMERICAN FRUIT GROWER MAGAZINE: Can you give me any information about the culture of dewberries? I planted some Lucretia plants last spring but do not know much about them.

Also, is it advisable to set young plants from red raspberries that have some cane maggots in them?—G. S., Michigan.

ANSWER: With reference to the culture of dewberries, I suggest that you send to the Department of Agriculture, Washington, D. C., and ask for Farmers' Bulletin 728. This will give you a much fuller discussion of the subject than I could give you in a letter.

It would not be advisable, in my opinion, to use young raspberry plants from a patch in which the canes are infested with maggots.

Propagation of Spruce

Editor, AMERICAN FRUIT GROWER MAGAZINE: I have some Kostor's blue spruce and I want to bud or graft cuttings onto our common spruce. Can you tell me how to do it?—R. E. A., New Hampshire.

ANSWER: You can readily graft the blue spruce onto young seedlings of Norway spruce by using veneer grafting and doing the work under glass in the winter. The grafts should be inserted near the base.

You can also start blue spruce from cuttings of green wood taken in the late summer. The cuttings should be bedded in clean sand and will need to be shaded for about a year. A long time and careful attention are required to get these cuttings properly started. Shading is necessary and careful attention to watering and temperature is important.

Credit Due to Dr. Denny

Editor, AMERICAN FRUIT GROWER MAGAZINE: Your March issue states that ethylene gas for ripening fruit was developed by Dr. R. B. Harvey of the University of Minnesota. The first record of work on oranges and grapefruit was carried out by Dr. F. E. Denny, formerly of the United States Bureau of Chemistry located at Los Angeles. His mention of the work was made in the *California Citrograph* of March, 1923. The patent covering the process is No. 1,475,938, under date of December 4, 1923. The experimental details were also published in the Journal of Agricultural Research.

I do not desire to detract from the work Dr. Harvey is doing with ethylene, but it seems to me appropriate that Dr. Denny should receive the credit that is due him for originating the process. May I request you to publish this information?—*E. M. Chace, United States Bureau of Chemistry, Los Angeles.*

Limestone for Fruit Trees

Editor, AMERICAN FRUIT GROWER MAGAZINE: Please advise me whether or not lime is necessary for the most successful growth of fruit trees. Will an orchard grow satisfactorily in a sour soil?—W. C. J., Ohio.

ANSWER: Most fruit trees will grow satisfactorily on acid soils. The peach appears to be directly benefited by applications of limestone. It is the only fruit, so far as I know, which appears to be directly benefited by limestone.

Practically all fruits, however, can be indirectly benefited by applications of limestone, especially on soils which are quite sour. Soils which are too sour will not grow leguminous cover crops. Unless large quantities of nitrogenous fertilizers are used in such cases, the trees will be unable to secure a sufficient nitrogen supply. On sour soils, it is a good thing to apply sufficient limestone to enable the legumes to grow. The legumes can then extract nitrogen from the air.

I think, therefore, that it will be advisable for you to apply sufficient limestone to put the soil in condition for growing legumes. It is probably not necessary to apply sufficient limestone to entirely correct the acidity.

Picturing the Light Six Sedan

A Quality Six with a Big 7-Bearing Motor

at the Price of a Four

Before you buy any car at less than $1000 glance over and into this Nash Light Six Sedan. And be sure to drive it!

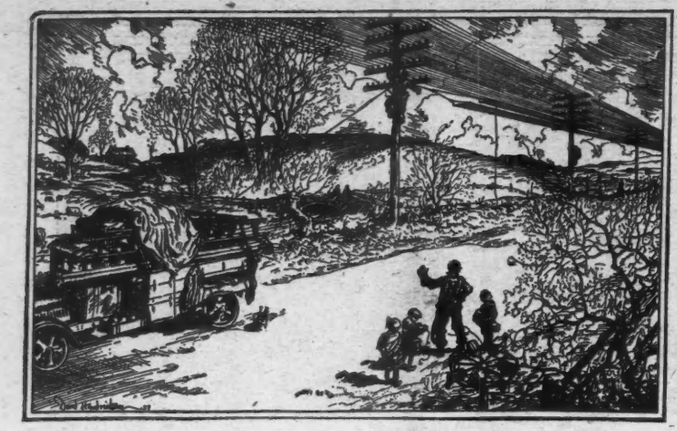
It is a Six, not a Four, and a Six with 7-bearings, *the world's smoothest type.* And most aggressive, as well. Watch this Nash step ahead when you step on the accelerator.

This car has the finest type of 4-wheel brakes in all the world. Front wheel brakes internal expanding—rear wheel brakes external contracting—*two-way* action for greater efficiency and safety.

And nowhere else will such a low price buy so much quality in finish and fittings. There are Double Beam Headlights; Air cleaner; Oil filter; Gasoline filter; Alemite High Pressure Chassis lubrication; Automatic windshield wiper; Rear vision mirror; and 5 Budd Michelin Steel Disc Wheels.

Instruments, including a gasoline gauge, are grouped in an attractive panel on the dash. All these are features you need for safety, comfort and satisfactory performance.

You always will be proud of your good judgment—your satisfaction will never end—when you buy a Nash! (5659)



Communication for a Growing Nation

An Advertisement of the American Telephone and Telegraph Company

THE first telephone call was made from one room to another in the same building. The first advance in telephony made possible conversations from one point to another in the same town or community. The dream of the founders of the Bell Telephone System, however, was that through it, all the separate communities might some day be interconnected to form a nation-wide community.

Such a community for speech by telephone has now become a reality, and the year-by-year growth in the number of long distance telephone calls shows how rapidly it is developing. This super-neighborhood, extending from town to town and state to state, has grown as the means of communication have been provided to serve its business and social needs.

This growth is strikingly shown by the extension of long distance telephone facilities. In 1925, for additions to the long distance telephone lines, there was expended $37,000,000. In 1926, $61,000,000. During 1927 and the three following years, extensions are planned on a still greater scale, including each year about two thousand miles of long distance cable. These millions will be expended on long distance telephone lines to meet the nation's growth and their use will help to further growth.

AT THE annual meeting of the board of directors of the Wenatchee District Co-operative Association, held in March, trustees were seated and new officers were elected for the coming year as follows: Levi M. Tigner, Cashmere, president; U. G. Pogue, Wenatchee, vice-president, and M. Rumohr, Leavenworth, secretary.

The other officers and heads of departments will remain the same as last year. They are as follows: F. C. Lambert, treasurer; A. J. Moller, auditor; C. W. White, general manager (in charge of sales); J. H. Auvil, manager credit and purchase department; J. L. Robertson, Jr., traffic manager; F. E. DeSellem, chief inspector, and S. B. Carnine, manager eastern district sales office.

In a recent ballot conducted among members, the association voted, by almost eight to one, to adopt an amendment to the by-laws, enabling local groups to operate under a local pooling plan during the 1927 season. Under the new amendment, those locals who desire to follow a local pooling plan, may do so, provided that on the first or second day of July of each year the members of the local vote to adopt a local pooling plan, as distinguished from the central pool.

The locals which do not adopt a local pooling plan will continue to operate under a central or district pool, as formerly.

The board of trustees, at the March meeting, passed a resolution giving its approval in advance to the formation of a local pool at any local shipping point by any existing local association or by any which may be formed hereafter.

THE CALIFORNIA Fruit Exchange, whose headquarters are at Sacramento, handled supplies to the value of $2,069,361 in 1926. Purchases consisted of 1325 cars of lumber products, 40 cars of baskets, 53 cars of paper and nails, 177 cars of grape kegs, and packing and general merchandise and spray material to the value of $100,000.

The lumber department, established in 1919, has now operated successfully for seven years and has returned net earnings of $809,192. The management believes that the lumber department has helped stabilize the shook industry and has forced operators to recognize a legitimate profit. It is considered a safety valve for the exchange. Logging by means of trucks has been discontinued during the past year, and a railroad has been built for the purpose.

Desperado—Hands up! If you move, you're dead.

Professor—But sir, your English is abominable. If I were to move, it would be a sure sign that I was alive.—*Stevens Stone Mill.*

ANNOUNCEMENT is made of the third summer session of the American Institute of Co-operation, to be held in co-operation with Northwestern University School of Commerce, Chicago, June 20 to July 16.

Arrangements have been made with more than 130 authorities on the various phases of co-operation in all parts of America and Europe to give special lectures at the coming session. Economists of the United States Department of Agriculture contributed to the programs of the two preceding sessions of the institute and are included among the speakers for the coming session.

Several special features have been prepared. These include a joint meeting of the national association of attorneys of co-operative associations and the association of co-operative accountants.

In addition to the regular lecture program extending over four weeks, five courses, open to advanced college students, are offered. Arrangements have been made whereby Northwestern University will give credit to students completing this work.

These special courses are: terminal market functions and the co-operative association, the organization and membership problems of California co-operative associations, price objective of co-operative organizations, problems of co-operative dairy marketing, and co-operative management problems. These courses will be in charge of professors and economists prominent in the co-operative movement.

The first course will deal with the methods of handling, storing and selling farm products in terminal markets, with special reference to Chicago. The course on California co-operatives will be given by an economist who has been making a special study of these organizations for five years. Under the general subject of price objective, an examination will be made of the price theories of various co-operative leaders and executives. At the same time, consideration will be given to the purposes animating the formation of associations and the determination of their form and general plan of operation. In the course of co-operative management, attention will be given to typical problems of practical management as handled by present-day co-operative organizations.

SHIPMENTS by the Illinois Fruit Exchange, Centralia, Ill., in the 1926 season, were equal to 709 carloads. A total of 372,358 packages were handled, including crates, flats, bushels and barrels. This was more than twice the volume of the business of the preceding year. The principal products handled were strawberries, apples, tomatoes, peaches, pears and vegetables. Shipments were made to 124 cities in 26 states and in Canada. Approximately 22 per cent of the shipments went to points in Illinois, 11 per cent to Michigan points, nine per cent to Missouri points, and eight per cent to Ohio points.

At the sixth annual meeting, held early in February, plans were made for the 1927 shipping season, which is expected to start in May. At the close of the 1926 season the exchange had a net worth of $8251.

A REPORT from the California Fruit Exchange, Sacramento, states that 12,092 cars of various kinds of fruit were shipped during 1926. This fruit was marketed in 386 cities and towns in the United States and Canada and in foreign markets. Forty-one per cent of the cars shipped were sold at private sale and 59 per cent in 11 auction markets. A satisfactory foreign trade was developed in South America and Cuba, and some sales were made in Manila, Singapore and Honolulu. Gross delivered sales value of this fruit was approximately $17,300,000.

Operating expenses for the year were one per cent higher than in previous years, due to extension of the sales department and creation of the office of special eastern representative and to increased expenses in the lumber department. However, the exchange reports that it distributed $600,000 in refunds to growers during the year. The "withholdings repayable" account amounts to $1,750,000, for distribution during the next five years.

Grapes, cherries, apricots, persimmons, pomegranates, peaches, pears, plums, prunes and quinces are among the fruits handled, and much attention is given to production and handling methods and to desirable types of packages for each class of fruit.

Scientific information is presented to the growers through *The Blue Anchor* magazine, which had a regular mailing list of 7000 in 1926. The magazine was distributed throughout the United States and was instrumental in acquainting people with the organization and its products.

THE SALE CREEK Strawberry Growers' Association of Sale Creek, Tenn., shipped 41 cars containing 16,874 crates of strawberries in 1926. The berries were sold f. o. b. shipping point according to standard United States grades, with shipping point inspection. The product brought a gross return to the association of $63,764 and a net return to the growers of $62,272, or an average net return of $3.52½ per crate. The average gross expense was 22¾ cents per crate.

Only two varieties of berries are grown by the members, the Aroma and the Klondike. The No. 1 berries are designated as "Signal Mountain Aromas" or "Signal Mountain Klondikes," as the case may be. Other crates are not labeled. The association has 173 members, and these had 300 acres of strawberries last year.

SOMETHING entirely new to the Northwest in co-operative marketing arrangements is that made by the Blue Mountain Prune Growers' Association of the Walla Walla-Milton-Freewater district in Washington and Oregon with the Walla Walla Traffic Association, a well-established group of nine shippers, under which the fresh prunes bound by the agreement will be sold only through traffic association members, and the latter will guarantee growers their first cost, including picking, packing, selling and freight charges set tentatively at $15 per ton. Nine directors of the growers' organization will be admitted to membership in the traffic association, with equal access to information regarding markets, quotations and distribution; and once a year the books of the traffic association will be opened to prune growers. It is understood also that the growers' organization or any member of it with carload tonnage may become a dealer, and as a member of the traffic association sell his own crop or that of others under the same $1000 penalty for price-cutting

that binds present members. Four hundred growers, producing 1000 or more carloads of fresh prunes annually, are affected.

Conditions in the industry, as existing since 1923, have been chaotic. Prunes have been grown for 25 years, the acreage increasing gradually until marketing became a problem in 1921 and a growers' co-operative, controlling most of the tonnage in one large pool, was organized in 1922. That year it made a fine record with a short crop, but in 1923, with 1400 carloads in the district, it went to pieces and growers' returns were written in red ink. The following year frost took practically all of the crop; in 1925, 600 or 700 carloads were shipped out at around $40 per ton; and in 1926, 1000 carloads at $18 to $20. The crop must be marketed fresh, for there are no dryers in the district, and the large movement necessary within a period of about four weeks contributed to uneasiness and encouraged price-cutting, which was common until the traffic association was organized.—*G. N. Angell, Oregon.*

DURING the past winter, 50 evenings were spent in the study of co-operation by farmers in northern Indiana. Five co-operative schools, each occupying one evening a week for 10 weeks, were held between November 8 and January 21. The average attendance was 31. Some of the farmers in attendance came for a distance of 20 miles, and two came 50 miles. The course of study was supervised by the state board of education, and the schools were conducted jointly by the state board and the Indiana Farm Bureau Federation.

The object was to instruct leaders in the various communities in regard to the facts and principles of co-operative marketing so that they would be in position to answer many of the questions arising among their neighbors and be prepared to meet some of the arguments presented against co-operative marketing.

IN FAR OFF Tasmania, a co-operative fruit association has been in operation for nine years. It is the Port Huon Fruit Growers' Co-operative Association, Ltd., of Hobart, Tasmania. The ninth annual meeting was held recently. The past season brought some very adverse conditions, and the operations of the organization showed a deficit of £2463 ($11,982.50). The report of the association was considered very satisfactory in view of the conditions which existed. The sum of £5000 was set aside early in the year to meet expected losses on overseas shipments.

The salaries of the co-operative for the year were less than one per cent of the turnover. In 1923, this figure was 1.5 per cent, in 1924, 1.33 per cent, and in 1925, 1.08 per cent. The association has a paid-up capital of £18,978 and reserves amounting to £5767.

GRAVENSTEIN APPLES are the specialty handled by the Sebastopol Apple Growers' Union of Sebastopol, Calif. Of the 360,250 boxes of apples handled in 1926, 322,122 boxes were of this variety. The remainder was made up of Spitzenburgs, Jonathans, Kings and several others in small quantities. Thirty-five varieties were packed and shipped in 1926, and of this number 15 varieties were represented by fewer than 50 boxes each.

The union began operations in 1911. It is a stock company with no local units. It operates a number of packing houses. Its net worth in 1926 was $2892, and the fixed assets, less depreciation, were valued at $172,551.

A THREE-DAY short course in co-operative marketing will be given at College Station, Texas, May 4, 5 and 6. It will be conducted by the Agricultural and Mechanical College of Texas in co-operation with co-operatives of the state and the United States Bureau of Agricultural Economics. The program is planned especially for extension workers, field men and directors of co-operative associations and others who are directing the co-operative movement in Texas. The first day will be devoted chiefly to the historical background of co-operation and to principles and problems of the movement. The second day's program will stress membership relations and sales problems. Financing, accounting and other operating problems will receive attention the third day. Specialists will conduct the school.

THOSE who are interested in legal decisions affecting co-operative marketing may obtain some excellent information along this line from a mimeographed circular recently issued by the Division of Co-operative Marketing, United States Department of Agriculture. It is entitled "Summary of Cases and Decisions on Legal Phases of Co-operation."

IN THE April issue, we stated that no co-operative association existed in the Watsonville apple district of California. This seems to be contrary to fact. Information has come to us within the last month that a co-operative or semi-co-operative has been established. Its name is the Watsonville Apple Growers and Packers, Inc. It was set up by various shipping interests to serve as a clearing house for the apple industry in that district. The unsatisfactory conditions of recent years, and particularly of the past year, were largely responsible for the organization of this association. Several attempts made in the past to form a co-operative in this district have resulted in failure.

MEMBERSHIP of the California Avocado Growers' Exchange, the headquarters of which are at Los Angeles, increased from 167 on December 31, 1925, to 395 on December 31, 1926. Thus, a gain of 136 per cent was made in one year. During its first year of operation (1924) the exchange handled 179,000 pounds of fruit. The shipments of 1926 approximated a half million pounds, and the 1927 crop is expected to total 1,000,000 pounds.

A specially designed grading machine has been installed by the exchange for the handling of the product. The fruits are graded and counted automatically. Fruit of the highest grade is stamped with the mark "Calado."

THE PAW PAW Co-operative Association, Paw Paw, Mich., handled products during the 1926 season to the value of $192,528. This amount was made up of the following items: grapes $169,492, apples $3461, cherries $12,758, raspberries $3725, strawberries $2909, miscellaneous $183. The association also handled and sold supplies to its members to the amount of $88,563. Total expenses amounted to $11,903, consisting of an operating expense of $8394 and a general expense of $3510. At the close of the year, the net worth was $20,172. Land, warehouses and equipment had a depreciation value of $7133.

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Apple Industry to Be Studied

AT A RECENT meeting in the Bureau of Agricultural Economics, called by Lloyd S. Tenny, chief of the bureau, questions that have arisen in connection with an economic study of the apple industry of the country were discussed. The object of the study is to develop a basis upon which apple producers may make plans for the advancement of their business. The market for apples will be analyzed. The demand and practices with respect to varieties will be investigated. Competition between varieties and regions, probable shifts in sources of supply for specific markets, and present status, recent trends, and probable future developments in each important commercial producing area, will be studied. The bureau will co-operate with the agricultural colleges and experiment stations in the states involved. Several divisions of the bureau will be concerned.—*The Official Record.*

Penitentiary to Develop Canning Plant

THE STATE penitentiary at Walla Walla, Wash., has developed preliminary plans for the construction of a canning plant for the benefit of the various state institutions. The plans call for the purchase of a complete equipment. If the plan is carried out, it is likely that some of the buildings of the institution will have to be expanded. It is expected that the prisoners will do the work that will be involved.

There is an enormous tonnage of fruits and vegetables grown in the valley, and without doubt there will be plenty of products available for the operation of a cannery. Besides furnishing large quantities of canned foods for the use of the various state institutions, the venture will furnish work for convicts who are now idle.

VIRGINIA has just passed a compulsory grading and branding law governing the shipment of packed apples in closed packages. The law should do much toward improving the quality of the pack. It will be enforced by inspectors working under the supervision of the Bureau of Markets. Under the law, apples of any grade may be packed, but they must be accurately and honestly branded in accordance with their actual condition.

ABOUT 75 per cent of the Idaho carlot shipments of perishables during the past year were moved out under shipping point inspection certificates, according to R. L. Spangler, director of markets of the Idaho Department of Agriculture. The department maintains from 10 to 45 food products inspectors at shipping points.

THE ANTI-DUMPING BILL which was passed by the recent Congress and which was signed by President Coolidge, should be more clearly understood by growers of perishables. The bill proposes to prevent the destruction by dumping, without good cause, of farm produce received in interstate commerce by commission merchants and others. The bill also requires that a correct accounting be given to all growers and shippers of perishables. Merchants who fail to abide by the provisions of the bill shall be guilty of a misdemeanor and subject to a fine of $100 to $3000 and imprisonment for one year.

The bill is to be enforced by the Secretary of Agriculture, who is empowered to make the necessary rules and regulations. Prompt investigations as to quality and condition of products and the issuance of certificates are to take place following the application of financially interested parties. Certificates issued in connection with such an investigation shall be prima facie evidence in all federal courts of the country as to the quality and condition of the produce.

The Senate committee on agriculture and forestry in favorably reporting the bill said:

"The bill deals with certain evils existing in the marketing of fruits, vegetables, melons, dairy or poultry products, or any perishable farm produce in interstate commerce. Its purpose is two-fold. First, it is intended to prevent commission merchants and others from destroying, abandoning, or dumping fruits, vegetables or other forms of perishable farm produce without good and sufficient cause, and, second, it is intended to prevent commission merchants and others receiving such produce on consignment from making a fraudulent report to the shipper concerning the handling, condition, quality, quantity, sale or disposition of the produce.

"It was developed in the hearings before your committee that an unscrupulous commission merchant may, under present conditions, receive a shipment of perishable produce on consignment and falsely report to the shipper that all or part of such produce has been dumped or destroyed on account of alleged deterioration, without the shipper having any means of ascertaining whether or not the produce was actually in such condition as to necessitate dumping, or whether it was actually dumped.

"Either the shipper or the commission merchant may make application to the Department of Agriculture for an inspection of such produce and receive a certificate as to its quantity and condition, which certificate may be used as evidence by either party in any civil or criminal action involving the truth of the statements contained in such certificates.

"Your committee feels that if such a law as is proposed in this bill were upon the statute books, the evils which undoubtedly do exist in the marketing of perishable farm produce would be greatly mitigated, and such a law would provide a better method of counteracting the action of the unscrupulous merchant."

THE ANNUAL grade and pack conference of representatives of apple and pear growers of Washington was held this year at Spokane, Wash., on March 24 and 25. The conference recommended several changes which will tend to standardize grading and packing. Recommendations of the conference are usually made a part of the state regulations by Earl J. Barnes, state director of agriculture, who presided over the meeting.

The three commercial grades of apples will remain as they have been, with a few minor changes in specifications. The minimum color requirements for the fancy grade in solid red varieties will be raised from 26 to 33 1/3 per cent.

Grade terms were defined more specifically than ever before and were drawn in conformity with practices already being followed by inspectors. Some persons have felt that inspectors have been given too much leeway in interpretation of the rules in past years.

The conference also decided that non-infested apples which do not meet the requirements for regular grades must be marked "cookers."

Following the recommendation of the state department of agriculture, the grades for pears were changed to conform with those in use in Oregon. Thus the two states will be placed in position to work out uniform standardization methods. Pear grades will be known as "extra fancy" and "fancy," and the specifications will be about the same as for the old fancy and C grades. An additional pear grade, to be known as the "cannery" grade, was adopted.

The conference adopted a resolution authorizing a committee to investigate packing and grading. An informal standing committee will be appointed by the director of agriculture, consisting of three members each from the Yakima and Wenatchee districts and one each from the other major districts. The committee will collect and exchange information regarding packing problems and methods for the information of future conferences.

An interesting resolution adopted by the conference was as follows: "Packed apples in any one package shall not vary more than one size up or down from the size stamped on the box." The conference proved to be very harmonious. There seemed to be a general desire on the part of grower representatives to maintain a high quality of grade and pack. At the same time, there was a desire to permit growers to take maximum advantage of opportunities to market their fruit in the best possible grades. The results of the conference seemed to be heartily approved by practically all in attendance.

STRAWBERRIES are available on the markets from December to July. Shipments start in a small way from Florida in December. The principal Florida shipments, however, occur during January, February and March. The majority of the shipments from Florida in January are by express in refrigerators, but considerable quantities move by freight in open crates. During February and March, the majority of the shipments are made by freight. The time of shipment from Florida as well as elsewhere varies considerably in different seasons according to weather conditions.

The Louisiana crop moves principally in March and April. Most of this crop is moved in 24-pint crates. Klondike is the principal variety. Most of the shipments are made by express. The Louisiana berries arrive on the market at a time when the shipments from Florida are slowing down and before the berries from North Carolina begin to ripen in quantity.

During May, strawberry shipments

are large from Tennessee, Missouri, Kentucky, Arkansas, Virginia, Maryland and Delaware. Other mid-season states also ship considerable quantities.

The crop from New Jersey, New York, Pennsylvania, Michigan, Wisconsin and the Pacific Northwest moves mainly during June, but shipments from some of these states continue in a small way into July.

The heaviest shipments occur from the middle to the end of June. One of the heaviest shipping days on record in recent years was May 31, 1924, when 663 cars were shipped. In 1925, the heaviest days were May 11, with 421 cars, and May 18, with 400 cars. In 1926, which was a late season, 495 cars were shipped on June 1.

In 1926, the leading states ranked in number of cars shipped as follows: Louisiana, Missouri, Maryland, Arkansas, Virginia, Tennessee, and North Carolina. In 1925, the order was as follows: Tennessee, North Carolina, Missouri, Virginia, Maryland, Louisiana and Arkansas.

Among the heaviest shipping points in 1926 were Marion, Md., 550 cars; Hammond, La., 506 cars; Ponchatoula, La., 489 cars; Independence, La., 445 cars; Selbyville, Del., 353 cars; Wallace, N. C., 355 cars; Chadbourn, N. C., 1256 cars; Castleberry, Ala., 239 cars; and Sarcoxie, Mo., 224 cars.

"WITH average yields in 1927, it seems likely that returns per acre to strawberry growers will be considerably less than the average for the past two years. Acreage has gained considerably during this period and caution should be exercised by growers who contemplate increasing their acreage this spring.

In the southern and mid-season states early indications were for an acreage for harvest in 1927, 22 per cent greater than that of 1926 and 18 per cent greater than the 1923-26 average. The earliest shipping states have an indicated increase over 1926 of 15 per cent, while Arkansas, the Carolinas, Tennessee and Virginia show 26 per cent more acreage than in 1926. The next states to ship, including Delaware, Maryland, Illinois, Kentucky and Missouri, will probably harvest a 21 per cent greater acreage than in the previous year. Late states have also shown a tendency to increase plantings. The expansion over 1926 has been especially marked in Arkansas and Missouri. Increases have also been large in Tennessee, Louisiana and Maryland."

THE ILLINOIS State Horticultural Society recently appointed a committee, composed of F. H. Simpson, A. B. Leeper, Senator H. M. Dunlap and J. W. Stanton, to make a study of the freight rate situation. It is expected that the horticulturists of the state will be asked for funds with which to prosecute the work of the committee. In view of the rate readjustments which growers in other sections of the country have been able to obtain, the society leaders believe it is particularly important that the rate situation be investigated from the standpoint of Illinois horticultural products.

Monthly Market Review

THE FOLLOWING summary of the fruit marketing situation was furnished by the United States Bureau of Agricultural Economics on April 11:

"Sales of produce, old and new, were helped by the cool weather of mid-spring. Movement from the South was slowed down a little and prices of some lines recovered, although the trend of new potatoes and onions was sharply downward, as usual after the opening of the active shipping period. The trucking season is about two weeks earlier than the average, and some sections are nearly a month ahead, compared with last year's slow progress. Carlot shipments ran 15 to 20 per cent heavier in early April this year.

Apple Markets Draggy

"Mild weather in mid-spring and the appearance of considerable stock in poor condition brought slight weakness to the apple market. Fruit showing much damage from scald and over-ripeness sold down as low as $1 per barrel, but hard, bright-colored apples still bring $3 to $4 per barrel in eastern markets and higher in middle western cities. The general range showed various declines of 25 cents to 75 cents per barrel and 10 cents to 25 cents per box, although northwestern boxed apples continue to bring within 10 cents of the season's best prices, having reached $2 per box for highest grade Winesaps at northwestern shipping points. Boxed apples and also the good grades of long-keeping barreled stock, including some Baldwins, Ben Davis, Winesaps and Albemarles, have been selling higher than a year ago. Foreign markets are of less importance now because most apples are too soft for ocean shipment, but prices of desirable fruit have been holding fairly well lately in British and German markets. Exports from the United States and Canada now amount to fully one-sixth of the season's commercial crop. Competition has begun from Australian apples, but the probable surplus from that source for export is much reduced this year.

"Domestic carlot shipments reached 128,000 cars by April. Last season about 7000 cars moved after April 1. Shipments from the Northwest seem to be decreasing rapidly, and principal activity is in eastern shipping sections —New York, Virginia, West Virginia and Pennsylvania. Apples are meeting early competition this season from strawberries as well as from citrus fruits from Florida and California.

Active Berry Season

"The strawberry harvest has worked northward from Florida to the Carolinas. Florida about doubled last year's shipments. Texas and Alabama have been shipping in a limited way, but the chief source of recent supply is Louisiana. Northern markets have been well supplied at a general range for good stock of 40 cents to 70 cents, quart basis. Production from five early-shipping southern states is expected to be about one-fourth greater than in 1926.

Oranges in Full Supply

"Shipments of oranges and grapefruit from all sections up to April ran about 8000 cars above last season. Combined imports have been about the same this season. Prices went low, especially for the small oranges. The outlook seems better now for the few thousand cars reported left. Probably the grapefruit shipments have shown a profit to growers, but the average returns from oranges were somewhat unsatisfactory. Demand has been moderately good. About half as many oranges as apples have been shipped in favorable years. The business of selling oranges is better handled than the apple trade, with more control of distribution of shipments; but a large acreage of orange groves has been planted in Florida and Texas the past five years, suggesting that full crops may be harder to dispose of unless new outlets can be developed."

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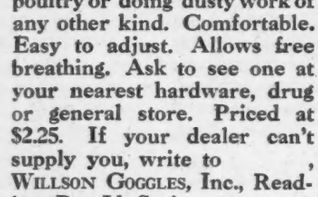

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Summary of Fruit Prospects

By C. E. Durst

IN KEEPING with our policy during the past few years, we are presenting again this spring summaries of fruit conditions and prospects in different sections. The first report was made last month; the second is given below. A similar report will be made for perhaps two more months. After that time, the government crop estimates will cover the situation effectively.

In the summaries given below, the state covered by the report is named, and the date of the report and the name of the person furnishing it are also included. The giving of opinions on crop prospects at this season of the year is a treacherous undertaking. The best authorities can easily make mistakes. Conditions change rapidly. These factors should be taken into account by growers in reading the summaries.

Massachusetts (April 7).—There was no severely cold weather in Massachusetts the past winter. With the exception of peaches, the prospect for all fruits seems to be excellent. The Baldwin crop will be lighter than last year, as this is the off year for the majority of Baldwin orchards. There was no appreciable winter injury to fruits; even red raspberries are in fine condition. A good many peach buds have been killed. In some sections and with some varieties the loss is serious, but there is still a fair crop in sight for the state as a whole. Apple and pear buds are just beginning to swell.—*F. C. Sears.*

New Jersey (April 4).—The latter part of March and the early days of April were quite cool, and fruit bud development made little progress. If the cool weather continues a short while longer, the fruit buds are likely to be safe from frost injury. Peach buds are not even showing pink as yet in central New Jersey, and apple buds are correspondingly backward.—*M. A. Blake.*

Virginia (April 11).—Apples so far are in good condition. A heavy frost occurred last night. Apples in eastern Virginia are in full bloom, and some have already dropped the petals. The bloom is lighter than a year ago, and we do not anticipate so heavy a crop.

The condition of peaches is problematical. A series of cold nights and frosts has caused some damage. Peaches are reported killed in some sections, but it is difficult to estimate the damage. Reports have come in indicating injury varying from 10 to 90 per cent. Elbertas were hardest hit, and the minimum injury was done to Belles. If no further injury occurs, Virginia should have a fair peach crop.

Plums, pears and cherries are produced in small quantities only in Virginia, and these have apparently withstood the low temperatures.—*F. A. Motz.*

Georgia (April 8).—A heavy drop of Hiley and Elberta peaches has occurred since the last report, due to frost damage during latter March or poor pollination. The drop has apparently been heavy in all parts of the state. There appears to be almost a total loss in northern Georgia from low temperatures. The present indications are that the Hiley and Elberta crops will be lighter than those of last year. At present, the total Georgia crop promises to be lighter than last year. In view of the lighter set, the fruit may size up better, so that the ultimate tonnage may not be greatly reduced. The Georgia Belle crop is fairly heavy in middle Georgia. This variety apparently has not suffered much from adverse conditions. The Early Rose and Uneeda crops promise to be rather light to moderate. There is a fairly good crop of Carmens in prospect. Our season continues to be earlier than normal. Mayflowers should be moving from Georgia this year early in May.—*O. I. Snapp.*

Ohio (April 11).—Prospects for good bloom of apples are favorable in most sections. The heavy producing orchards of last year promise a lighter crop this year. The peach prospects are good in most sections, although considerable chilling of buds occurred in portions of the lake region. Fruit bud development has been two to three weeks in advance of normal, but in northern Ohio they have been held back by recent cold weather.—*J. H. Gourley.*

Michigan (April 5).—No change in fruit prospects has occurred in Michigan during the past month. The prospects for fruit crops are good, except that there has been some injury to peach buds. Consequently, the peach crop will not be as large as in 1926.—*V. R. Gardner.*

Illinois (April 4).—The situation has changed very little since my former report. Slight injury to peach buds has been reported in only a few instances. There have been one or two frosts when peaches were in bloom, but no damage has been done. Apple bloom generally is promising, and at this date the prospects for a crop of apples and peaches are good.—*M. J. Dorsey.*

Iowa (April 5).—It is difficult to estimate the amount of bloom for apples at this time. Due to the large crop borne last year, the bloom will probably be spotted in many orchards.

The past winter has been mild and most fruits, particularly apples, have survived the winter with practically no injury. Sour cherries, in some places, show one-fourth to one-third of the buds killed. Peaches in southeastern Iowa were reported severely damaged in December. Small fruits have evidently passed the winter in excellent condition. Grapes should bear a full crop, except for the fact that the vines made a rather short growth in many sections last year, due to extremely dry weather.—*H. L. Lantz.*

Missouri (April 5).—The condition of the fruit crops in Missouri at this time is excellent. Even peaches promise a fair crop in all parts of the state.—*T. J. Talbert.*

Arkansas (April 8).—Apple buds are in extremely good condition and promise even a better crop than I estimated in the former report. There should be 80 to 90 per cent of a full crop if conditions continue favorably. There was slight injury to a few buds from recent freezes, but buds were so numerous that this should not interfere with the fruit crop.

There will be only 15 to 20 per cent of a peach crop in northwest Arkansas, due to recent freezes. Central Arkansas reports a full crop in some of the orchards and a poor crop in others. There should be 50 to 60 per cent of a crop there. South Arkansas, as a whole, will have a better crop than this, although there are instances of severe injury there.

The grape crop of northwestern Arkansas seems to be uninjured and promises to be heavy.

While there was some frost injury to early strawberries, there are prospects for a good crop on the whole. We will perhaps ship more berries from this section than we have ever shipped in any season before.—*J. R. Cooper.*

Tennessee (April 4).—Apples are in full bloom, and prospects are good for a fair crop. Barring damage from late frost, Tennessee will probably produce from 50 to 60 per cent as many apples as were grown in 1926. The heaviest bloom is occurring in orchards that have been cultivated and fertilized. This is the off year for unfertilized orchards, and the prospects for a crop are slight in such orchards.

A recent freeze, followed by a frost two mornings later, practically wiped out the 1927 peach crop in the Chattanooga, Dayton and Cleveland districts. In the Kingston, Harriman and Clinton districts the damage has been very severe, but there is a prospect for a 25 per cent crop. We expect a heavy May drop on account of imperfect pollination, caused by cold weather at blooming time. Delayed dormant spraying has been completed, and orchards generally are in a good state of cultivation.—*J. L. Baskin.*

Texas (April 5).—Peaches are in full bloom in the eastern commercial section. Low temperatures during two cold periods in March injured peaches and plums in varying degrees, particularly in north central and northwestern counties. However, prospects still remain good for better than two-thirds of a full crop.

Shipments of citrus fruits are over for the season, some 800 cars having been rolled. The LCL, express and truck shipments will add at least 200 cars to this amount. A larger crop than ever before is promised for next fall.—*H. H. Schutz.*

Colorado (April 12).—No change has occurred in apple prospects the last month. A full crop is still promised. Peaches were somewhat injured in latter March. There are, however, enough blossoms left to make a normal crop with proper thinning of the fruit. Cherries and plums are unhurt and give promise of a full crop. Apricots will produce about half a crop. Weather conditions have held back the buds, and unless late frosts occur, we expect a normal or better than normal crop of all fruits.—*E. P. Sandsten.*

Washington, Wenatchee Valley (April 4).—Apple trees came through the winter in fine shape, and the late spring is retarding the blossoming period. Prospects are, therefore, good for a normal yield. Past experience in this section has proved that a short growing season produces a better quality fruit than a long growing season, and it is naturally to be expected that the quality of fruit this year will be above the average. All varieties except Spitzenburg seem to carry buds for a normal yield. We expect blossoming to occur between May 1 and 10.

All varieties of pears, except Bartletts, appear to carry sufficient buds for a full crop. Some sections report that the Bartlett crop will be short of last year's production. The yield of Bartletts will perhaps be 70 per cent that of last year.

Apricots have enough buds for a heavy bloom. Very little damage from winter injury has been reported.

Sub-zero weather during the first part of January injured the peach crop in most sections of the state. This section will perhaps have 50 per cent of the normal crop.

No damage has been reported on cherries. If favorable weather prevails during the blooming period, we expect a heavy yield.

Apples are the predominant fruit crop in the Wenatchee district. The acreage of the other fruits mentioned is comparatively small. However, the acreage of pears, cherries and apricots is on the increase.—*J. H. Auvil.*

Washington, Yakima Valley (April 6).—There is little or no change to be made in the report for apples which was sent you last month. We figure about 10,000 cars this year, as compared with 13,000 to 14,000 shipped last year.

The peach estimate for 1927 is now 500 to 600 cars, as compared with 1243 cars shipped last season.

The pear crop promises to be about 3000 cars, as compared with 4000 in 1927.

The dormant sprays have been applied exceptionally well this year. Both lime-sulphur and oil sprays have been used.

Peaches and apricots in the lower valley are in bloom. Growers in the localities which are subject to frost have their heaters in their orchards and are prepared for the worst, which we hope will not come.—*Luke Powell.*

Oregon (April 9).—Winter has been rather severe for this climate in some places, resulting in considerable injury to cherry, peach and apricot buds. In some places, peach tree trunks have been severely injured. Red raspberries have suffered as much as 20 per cent damage in our most important

red raspberry sections. The injuries mentioned, together with the heavy crop produced last year, will make our fruit crop this year lighter than that of last and probably below normal. The spring so far has been wet and backward, but no damage has resulted from late frosts or rains.—*W. S. Brown.*

California (April).—Field conditions in the California citrus industry are promising. The heaviest crop of Valencia oranges in history is now on the trees. All districts report the orchards in better condition than for two or three years.

Ventura county reports an exceedingly heavy crop of lemons, which is to move early if possible. Reports from various districts regarding deciduous fruits are optimistic. In a few places frost has done some damage, but a normal crop of fruit is still promised in practically all places. The heavy winter rains have left the soil in fine condition.—*Agricultural Department of Los Angeles Chamber of Commerce.*

How to Grow and Market Raspberries

By H. M. Larwick

SIX YEARS AGO, I planted my first raspberries. I set out two rows about 125 feet long, six feet apart and about 18 inches apart in the row. The next winter the rabbits cut off every plant, some six to eight inches from the ground, so the next thing I had to do was to try to keep the rabbits out, and I put up a four-foot two-inch mesh woven wire fence all around my lot 75 by 125 feet. That stopped the rabbits but I did not get many berries the next summer. The following year I got a fine crop of nice large berries. I set out two more rows and they did very well. Then I planted two more rows two years ago and from these six rows of Latham raspberries, I picked 770 pint boxes of the largest and finest berries that anyone in this vicinity had ever seen. The picking lasted six weeks.

As to the last two rows that I planted, I placed them three feet apart in the row, and I found that these two rows yielded more and larger berries than the other four rows which I had allowed to grow into solid rows.

I allowed no new plants to grow between these hills and I had about four canes to the hill. I picked nice large berries for a week longer than from the others.

I do not allow weeds to grow at any time of the year. I use a hand cultivator without the shovels, using only two sharp knives which cut about an inch under the surface, just enough to loosen it and keep the weeds from getting started and to keep down the sucker plants. I go over the patch every 10 days until picking time, and once after the fruit is picked, all old canes are cut out and put in a pile and burned. All the new canes are left until spring, and then I gradually cut them out as the time progresses and the weaklings show up.

For fertilizer I use well rotted manure and put it on in the fall of the year.

I want to go back again just for a minute to the planting of raspberries. I believe that by planting them at least three feet apart in the row it is much easier to control the mosaic disease; at least, after we have learned to know it when we see it. As to the height of the canes that are left to bear fruit, I cut them back in the spring to about 36 inches, and the best remedy that I have found to keep the plants strong and thrifty is to keep all weeds away from them.

One thing that I do not believe in is mulching rapsberries, for this reason: that it is undoubtedly a very good breeding place for all kinds of insects and a good hiding place as well. If the top of the soil is kept loose and the plants are put in fairly deep, they will withstand a lot of dry weather.

Marketing

I used a small advertisement in our local paper stating that on and after a certain date, I would have some very fine red raspberries for sale and that they could telephone in their order and I would let them know when to come and get them. I did not state any price. The orders came in so fast that I could not take care of them. The largest orders came from the farmers out in the country. In town, I would deliver them to the homes. The first two weeks I received 20 cents per pint and the balance of the season, 18 cents. I guaranteed my berries to be clean and not over-ripe. The boxes were well filled, and I did not have to advertise more than once, as my first customers did the advertising after that. I think that the biggest trick in marketing raspberries is to see that the berries are all clean and sound, and that the boxes are all evenly and well filled. Then your customers will always come back for more.—*The Minnesota Horticulturist.*

Another Mild Winter

A REMARKABLE series of mild winters in the United States has occurred since the severe winter of 1917-18, according to the Weather Bureau of the United States Department of Agriculture. The winter of 1926-27, just closed, has been in general, and over most of the country, one of the mildest of the long series. Other outstanding mild winters were those of 1920-21 and 1923-24.

A few small areas along the northern border of the country were slightly colder this year than usual, but in all other regions the winter was warmer than normal, and decidedly so in the South and Southeast, temperatures ranging from three to six degrees above normal. As a result of the mild weather in the South, vegetation there at the end of February was abnormally advanced, with early fruit trees in full bloom, and peach buds showing color as far north as the southern Ohio Valley.

In comparatively recent years zero weather has been experienced as far south as the east Gulf Coast, but this year such low temperatures did not extend farther south generally than Pennsylvania, Kentucky and Missouri. No previous low records were broken anywhere in the country, but the maxima equaled or exceeded the previous high record at many stations. There was more than the usual amount of snowfall in the Northeast from the lake region eastward and south to Pennsylvania, but otherwise, east of the Rocky Mountains, there was generally less than the usual fall of snow.

Interesting in comparison is the report from the southern hemisphere, where summer time occurs during our winter. In South America, especially Argentina, the outstanding weather feature was the unusual and persistent warmth, averaging three degrees above normal, while in Australia the season was generally mild and warm, although with no harmful temperatures, and accompanied by unusually favorable rains.

Unattractive Shrubs from Severe Pruning

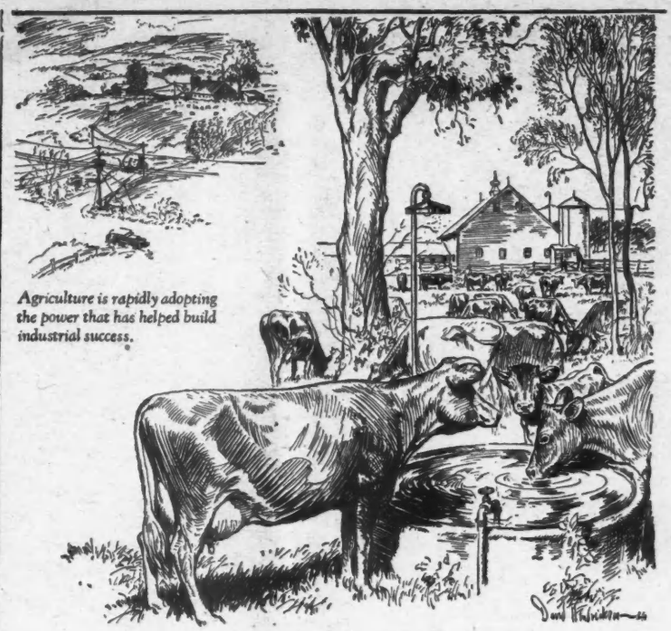
THE NATURAL HABIT of growth of a shrub is usually the most pleasing, and this fact is kept continually in mind by the successful gardeners who do their own pruning. They know that it is no more practicable to prune all shrubs alike than it is for the fruit grower to prune his apple, peach, pear and shade trees all alike.

The principal objects in pruning shrubs are to remove dead and dying wood, to improve the form and to increase the bloom. Over-pruning, or pruning that is too severe, is as detrimental as no pruning. All the beauty is lost if the pruner cuts back severely the long, graceful shoots of such plants as Forsythia or Spiræa Van Houttei. It requires several years to get such plants back to their normal habit of growth after severe trimming.

On the other hand, plants which are entirely neglected soon fill up with a lot of dead wood. New shoots find very little opportunity to come up through this old wood, and the shrub soon presents a neglected appearance.

The best treatment is light annual pruning in which some of the old wood and all of the dead wood is removed.

Prof. M. A. Blake, chief in horticulture at the New Jersey Agricultural Experiment Station, has prepared an interesting and practical circular on "The Pruning of Shrubs." This circular brings out some of the reasons for pruning and best methods for properly carrying out the work. It can be obtained by sending a post card to the Mail Clerk, Agricultural Experiment Station, New Brunswick, N. J.



Agriculture is rapidly adopting the power that has helped build industrial success.

The electrical industry brings forty years' experience to the farm

NO LONGER is rural electrification only "a possibility." The building of rural lines is in active progress; and the policy of electric light and power companies is to extend rural service as fast as circumstances will permit.

The electrical industry is applying the experience of forty years of service to cities and industry to the problem of delivering electric service to farms. Where the demand is sufficient to justify the building of lines on a business basis, farmers are having no trouble getting service. For, to derive the full benefit of rural electrification, the varied use of power as well as light must be applied.

Only through cooperation between the producers and the consumers—light and power companies and the farmers—can rural electrification be brought about. The farmer should take advantage of the great variety of things electricity can do. The industry, meanwhile, is working with representatives of farmers in twenty states to devise new equipment and improve that now in use.

The benefits of electricity which are now enjoyed on 260,000 farms will be extended to hundreds of thousands of progressive farms within the next few years. Ask your power company for information and cooperation.

The Committee on Relation of Electricity to Agriculture is composed of economists and engineers representing the U. S. Departments of Agriculture, Commerce and the Interior, American Farm Bureau Federation, National Grange, American Society of Agricultural Engineers, Individual Plant Manufacturers, General Federation of Women's Clubs, American Home Economics Association, National Association of Farm Equipment Manufacturers, and the National Electric Light Association.

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The following letter was received by a company which manufactures corn syrup:

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HERE is what happened — the rescuer's own story:

"Suddenly the kitchen was filled with flame and smoke. The cook was screaming hysterically. The fire was spreading rapidly and I knew I had to move fast to save her and the house. In a second I seized the Pyrene Fire Extinguisher and with a few strokes put out the blaze."

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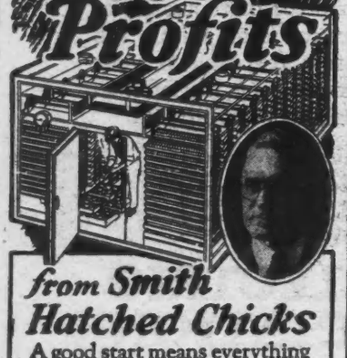

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A good start means everything to future profits. Poultrymen realize more from chicks that are hatched right. Chicks hatched in the Smith 47,000 get more oxygen and fresh air than in any other incubator.

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How Trees Use Water

(*Continued from page 8*)

leaves are prodigal in their use of water. Just what benefit the plant may derive from this stream of water passing through it, may well be left for another story. In general, the question has not been settled, and many physiologists are inclined to believe that transpiration is a necessary evil.

Transpiration Rapid in Early Morning Hours

Transpiration goes on rapidly during the early morning hours. Soon, however, a deficit of water occurs in the leaves and nearby twigs and branches. Furthermore, sufficient water to supply the leaves does not come up from the roots. The situation is roughly analogous to a windmill tank, with a two-inch pipe for drawing off water and a one-inch supply line. When both are open, the time will come when the reserve supply is exhausted. When this occurs with plants, they are said to wilt. Wilting is a natural phenomenon known to every gardener, but perhaps it is often unrecognized in the orchard.

The wilting just described is temporary in nature and takes place nearly every bright day. Its severity varies with climatic conditions. At night, the water supply in the tree is again replenished, and the leaves again become turgid.

During these periods of temporary wilting, a curious process goes on in the tree. The leaves draw upon nearby fruits for water, and it is possible to detect, by squeezing the fruit first in the morning and later in the afternoon, that the fruit has lost considerable moisture. The leaves are able to do this because they possess what is known as a greater osmotic concentration than the fruit. As the fruit ripens, however, its osmotic concentration increases because of the accumulation of sugar, and the leaves are unable to extract moisture as they did when the fruit was green. This interesting fact was described by Chandler, who made extensive studies on the sap concentration of plants. One of the interesting experiments conducted by Chandler was that of the behavior of leaves and fruit on a detached portion of watermelon vine. The leaves, drawing water from the melon, remained green and turgid while the fruit shriveled to less than half its original size. The leaves had been able to maintain their turgidity with the water drawn from the fruit. Similar results may be observed with apples before the fruit is fully ripe on nearly any clear warm day. Apricots in California showed a similar response. Growth measurements of the fruit by a self-recording instrument indicated distinctly that the growth was made at night and that some shrinkage occurred during the day. The growth during the night was greater than the shrinkage of the previous day; hence, the result was a net gain in size of the fruit.

Roots Absorb Large Quantities of Water

In spite of the fact that the roots of the tree cannot supply all of the water which could be given off by the leaves during the daylight hours, a surprisingly large amount of water is taken from the soil by the roots every day. The inevitable result is that, unless this loss is replenished, the amount of moisture in the soil in the root zone will be reduced to the point at which the tree cannot remove any more water. In other words, all or practically all of the available soil moisture has been used. Plants in this condition are said to be permanently wilted. They do not revive at night or during cloudy weather, and the only way they can again function normally is by the addition of moisture to the soil either through the natural agency of rain or through the application of irrigation water.

This condition is generally most noticeable in old orchards, particularly if closely planted. Young trees usually do not show this distress, probably because of the fact that there is available to the roots new and unexplored soil for the roots to penetrate. Old, closely planted trees may be likened to pot-bound house plants. Repotting gives the roots a larger territory to explore, hence waterings may be less frequent until the extension of the root system again produces a pot-bound condition. It is not possible to "re-pot" closely planted trees, hence waterings should be more frequent than with trees planted further apart.

What Are Stomata For?

The question may then well be asked—"What are the stomata for; can they regulate the amount of moisture given off, and thus cut down the amount of moisture removed from the soil, and thus enable the tree to function normally during the dry period?" Before attempting to answer this question, it might be well to consider some experiments recently reported by the University of California. Careful studies were made on the behavior of stomata of peach, prune, and apricot trees. It was found that in a soil containing available moisture, the usual behavior of the stomata was as follows: opening occurred immediately after daylight (Figure 1); the maximum width was found to occur between 9 a. m. and 12 o'clock (Figure 2) noon, after which the stomata began to close slowly (Figure 3) until the greatest closure was reached between 8 p. m. and 11 p. m. During the night, the stomata remained closed or practically so.

On the strength of this evidence, it would seem that it might be argued that the stomata closed in order to reduce transpiration and cut down water loss in the tree, thus allowing all parts of the tree to remain turgid. Two other lines of investigation showed that this theory was not exactly true. First, moisture determinations of all parts of the tree were made at stated intervals during the day. These experiments showed that all parts of the tree began to lose moisture as soon as the stomata opened, and furthermore, this reduction in water content could be detected as far back as the main trunk and roots as early as 9 a. m. This fact meant that the leaves and twigs did not contain their maximum water content except during the night and for a brief period following sunrise. The water content of all parts continued to fall until between 12 o'clock noon and approximately 3 p. m. It seemed that the stomata closed as a result of the lessened turgor of the guard cells rather than in an attempt to conserve moisture.

Secondly, transpiration readings were taken on the leaves of trees similar to the ones used in the experiment, and it was found that while transpiration was very rapid during the early part of the day, the rate of transpiration decreased *before* the stomata began to close. In other words, the stomata closed in response to water loss from the tissues of the leaf rather than in an effort to reduce this loss. Stomata, however, serve other purposes than as openings through which water is evaporated. They are the openings through which the interchange of oxygen and carbon dioxide takes place. The interchange of these gases is one of the factors upon which the process of photosynthesis of the plant depends. Hence, while the stomata might be permitting the loss of water much needed to retain turgor in the leaves, they may at the same time be serving in another important capacity.

Trees in Moist and Dry Soil Show Same Response

Trees in soil with little or no available moisture showed essentially the same response in stomatal behavior as trees in moist soil, except that the stomata did not open so wide (Figure 4) and began to close earlier in the day. Trees in this condition which showed but slight stomatal opening and early closing very soon gave other signs of distress. The foliage on peach trees lost its bright green color and became dull; the prune leaves curled; and the apricot leaves in the interior of the trees began to turn yellow and fell off. All leaves showed a drooping tendency.

It would seem that the best time for irrigating in sections where necessary is somewhat in advance of this period when the trees show distress. The liberal use of the soil auger is helpful in determining when water should be applied.

Many growers are prone to neglect their orchard after the crop has been harvested, considering that the big drain on the water supply was largely stopped when the fruit was picked. As a matter of fact, the amount of water removed by the fruit is comparatively insignificant as compared with that which is lost every day by the leaves. A simple calculation will show this to be true. A fairly large yield of peaches may be said to be 20 tons to the acre. Of this amount, probably between 85 and 90 per cent is water. On the other hand, an acre inch of water (which is just sufficient water to cover one acre an inch deep) weighs approximately 111 tons. Orchards of bearing trees often need to be irrigated two or three times a season, with as much as six or eight acre inches of water at each application. Compared with this amount, 20 tons is relatively small.

Other Processes Taking Place

The grower should remember that other processes are going on in the tree as long as the leaves are green. Fruit buds are being strengthened, reserve food material is being stored, and roots are being nourished. Therefore, it is often the case that the irrigation following the harvesting of the crop is the most important one of the whole year.

Formerly, a great deal was heard about the danger of encouraging growth too late in the fall. Late growth meant immature wood and buds which were easily injured by low temperatures. As far as conditions in most fruit areas in California are concerned, this trouble is not as dangerous as was thought at one time. For example, many growers in the Santa Clara Valley regularly irrigate their prune orchards in October after the crop is picked. This practice seems to make for stronger fruit buds, and no injury due to immature wood has been reported.

In another case, some peach trees near a break in the irrigation pipe line were continuously supplied with water from August until late in October. The soil was kept practically saturated to a depth of at least five feet. These trees matured their buds and wood, lost their leaves at the normal season, and suffered no injury during the winter. They blossomed heavily at the usual time the next spring. As these trees were also being used experimentally, certain observations made from time to time during the fall showed that the wood was hardening the same as the wood on other trees from which water was withheld.

"THE ARSENIC Content of Sprayed Apples" is the title of a publication just issued by the Boyce Thompson Institute for Plant Research. It describes experiments conducted by Albert Hartzell and Frank Wilcoxon. After giving brief abstracts of the work of other investigators on the subject, the authors give a detailed account of their own investigations.

It was found that apples sprayed according to a standard schedule contained arsenic in amounts considerably below the limit adopted by the Royal Commission on Arsenical Poisoning in 1903. The authors also found that the amount of arsenic contained in apple cider and apple jelly made from the sprayed apples was even less than that found in the original apples. The experiments were conducted at Yonkers, N. Y., during 1926.

June Drop Control of the Apple Curculio

(*Continued from page 4*)

a longer period, until after mid-July, when it is generally necessary to take them out of the orchard, because the apple crop on the trees begins to weight down to within their reach. With Ben Davis, the apple curculio eggs laid as late as July 1, may drop with the apple and start into a three or four weeks' development under the trees.

Do Not Make Permanent Hog Pasture of Orchard

It should be emphasized that the pig method for the control of the apple curculio does not mean to turn the orchard into a permanent hog pasture. About 100-pound pigs can be best purchased at the late winter sales on farms, then roughed along, to be turned into a mixed variety orchard about June 15 or when the June drop begins. In two, three or four weeks, or as soon as the June drops are cleaned up, the pigs should be taken to other lots for fatting.

Our trials have shown no benefits from running pigs in the orchards during the hibernating period of apple curculio. Pigs may be of value for a short period after harvest in cleaning up drops carrying apple maggot. The apple curculio seems to be prevalent more to the south of the apple maggot regions.

The upper apple shows the character of curculio injury to young fruit. The lower one shows feeding punctures in full grown fruit

One of the measures taken against the apple curculio in the past consisted in doing away with hibernating places. There is woodland next to one of our orchards under other ownership, held in natural state, not pastured, that casts shade into our orchard from the south. This is the finest hibernating place imaginable. Our 1925 pig treatment cleaned out the apple curculio in a remarkable manner right down to the fence line of this timber. In another orchard plot in which there is a brushy ravine cutting through, even better results were secured.

The June drop control gets the new beetles before they have an opportunity to develop, so if the treatment has been thorough, there is no chance for the apple curculio to reach hibernating places.

Pigs Have Given Direct Profit

We spray five to seven times each year for the control of codling moth, scab, blotch and other pests, and for attempted control of apple curculio, at considerable cost. The use of pigs to combat the apple curculio in the two seasons that we have been using them has shown a direct profit, besides that of cleaning up this insect. In 1925, each pig used returned a net profit above cost and feed of $10, and in 1926 a net profit of $7.65 each. Because of the unusual demand, $2 per 100 pounds above the market price was paid for the stock pigs in 1926.

Dr. Fulton found in the summer of 1925 that when apples carrying apple curculio eggs or larvae were buried to the depth of ordinary disking, the beetles were able to mature and emerge from the apple and earth. Cultivating the orchard after the June drop begins must be avoided to enable the pigs to find and destroy all of the drops. April and May cultivation of apples is probably sufficient for much of the Middle West.

Apple growers with mostly young plantings probably do not have the apple curculio pest, but as the trees become older and cast more shade, those located south of a line through central Illinois, Iowa and Nebraska are likely to become troubled. The June drop control gave us the first real results in 10 years' effort to get rid of apple curculio in our orchards.

Thinning Fruit to Improve Quality

(*Continued from page 5*)

duction in foliage. Thinning will relieve this condition and also improve the diffusion of light through the tree; and light is an important factor in the coloring of apples.

Thinning Demonstrations Verify Conclusions

In thinning demonstrations carried on by the New York State College of Agriculture, the co-operators invariably report better color and quality from thinned trees. Better size and uniformity are also outstanding effects of the thinning as reported by these men. The results have been accomplished without any appreciable reduction in yield, which is further proof of better size of the thinned fruit; size makes up for numbers.

Some have reported worth while reductions in the percentage of disease and insect-injured fruit by thinning. It is possible to remove imperfect fruit in thinning, yet very few take the time to watch closely for such specimens. When the entire orchard is thoroughly sprayed, the fruit may be as clean from unthinned as from thinned trees. Of course, when the fruits are touching, control measures are more difficult.

Other Advantages of Thinning

The decrease in the labor of handling the crop is a factor often overlooked or ignored altogether, but it is very probable that the saving effected in this one respect is often sufficient to cover the expense of thinning. It is well to remember that the fruit not thinned off will have to be removed at harvest time and so will increase the cost of picking. Add to this the additional grading expense incurred in handling a larger amount of inferior fruit from unthinned trees, and the cost of thinning does not look so formidable.

Thinning will promote better tree vigor and may thus tend to steady the yields; but thinning will not insure annual bearing. Apparently, the fertilization of the blossoms and the setting of the fruit are the processes primarily concerned in limiting the crop for the following year. Of course, thinning may possibly be done so late as to take place after the period of fruit bud formation, but if the fruit is once set, thinning seems to have little effect on fruit bud formation for that year and, consequently, on the crop for the next year.

Reduction in breakage of limbs may amount to considerable. The total crop is not materially lessened by thinning, so that the actual weight on a limb is probably not much reduced; but undoubtedly the load is better distributed, which would lessen the strain.

How and When to Thin

No very definite rules for thinning that will apply to all orchards can be laid down. Conditions must be considered, for thinning will not pay under all circumstances. In the first place, the tree must be loaded beyond its capacity to mature a satisfactory crop. In the second place, the fruit must be of a commercial variety and well grown; it will not pay to thin uniformly poor fruit.

Experiments have indicated that if the thinning is moderate—about six inches between fruits on a branch—the total yield will remain about the same, but the size of the fruit will be much larger. Thinning to 10 inches apart may reduce the yield materially without affecting other factors more favorably. Thinning to much less than six inches apart, on the other hand, will not have the desired results. Under average conditions then, six inches is probably a safe distance, and, of course, all clusters should be broken. Indeed, the more common error is not to thin too much, but not enough. It seems a terrible slaughter while the apples are small, but in the end we wonder at the large size and handsome appearance of the crop. Half-hearted thinning is a waste of time, for the effects will be scarcely perceptible. Fruit may be thinned rapidly by grasping the branch with

(*Concluded on page 23*)

DOES YOUR SPRAY *defy* THE WEATHER?

What happens when a rainstorm comes up just as you have finished spraying? Or when, night after night, your orchards are drenched with dew?

Does your spray run off, and go to waste on the ground?

But that's not the worst of it! The loss of the spray materials and your labor isn't nearly so important as the danger to your fruit and vegetables? With the spray gone, the trees and plants are no longer protected against insect pests and fungous diseases.

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KAYSO is a calcium caseinate preparation which increases the efficiency of spraying in at least three important ways:

1—By keeping the spray mixture in uniform suspension it overcomes settling and clogging in the tank. The last gallon is as strong as the first. As a result the mixture covers more trees and plants than the same mixture without KAYSO.

2—A mixture containing KAYSO covers completely with an even, all-over coating. This assures better protection than a spray that dries in spots, leaving much of the surface unprotected.

3—KAYSO makes the spray *stick*. It overcomes much of the run-off in liquid spraying, and safeguards the spray against rain and dew.

The cost of adding KAYSO to your spray is so slight, and the advantages so great and so profitable, that you can't afford *not* to use KAYSO in all your spray mixtures, wet and dry.

Thousands of farmers all over the country are using it year after year. Editors and government experts recognize it as the ideal spreader and adhesive.

But prove it out to your own satisfaction. Order a trial quantity for use in your next spray. Ask your dealer or write us for particulars about your own spray problems.

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175 Franklin Street, New York
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KAYSO
SPRAY SPREADER & ADHESIVE

SPREADS THE SPRAY AND MAKES IT STAY

The Orchard Home Department

By Mary Lee Adams

Protect Your Clothing

WARMTH and sunshine mark the return of spring, and how we welcome the whir of wings that bear back to us the sweet singing birds. Other and far less welcome visitors are also on the wing. From South to North, keeping pace with approaching summer, come the hungry hordes of clothes moths.

Make ready for their reception and extermination. The further south you live, the more thorough must be your methods, as the mothless season far south is so short. Even in the furnace-heated houses of the North, some clothes moths may survive the winter.

Watch for the tiny whirring moth that avoids the light and scuttles into cracks, crevices and corners. Kill all you can. Though the moth itself is harmless to gnaw furs or clothing, the tiny worm that will hatch from the eggs soon to be laid, will feed on cloth (except cotton cloth), furs, felts of pianos, carpets, etc.

Everything that is to be packed away should be vigorously beaten, brushed and shaken. A fine-toothed comb may be used to dislodge possible eggs in furs. If every egg is removed before laying the object away, it is not difficult to protect it from injury.

When the garment or upholstered furniture must be left unprotected, a good thorough brushing and sunning every two weeks will go far toward keeping them free from the eggs and larvae. Furs especially should be hung in the warm open sunshine for some hours before packing them away.

Now, if we could be sure that the last live moth or egg had been removed, all that would be necessary would be to place the garment in an air-tight container. A paper bag such as can be bought cheap at many stores is excellent. So is any paper container, box, bag or bundle, if the cracks are all carefully sealed with gummed strips. Cedar chests that close tightly are valuable, as the aroma from the oil in cedar wood protects the contents.

Since unsuspected depredators may still be harbored after all your brushing and beating, you had best make assurance doubly sure by adding some certain moth-killer to your package. Naphthalene in flakes, or moth balls, is first rate. The odor is deadly to moths, and you can readily see it must be confined tightly. A pound of good naphthalene is sufficient to scatter among the clothes or blankets in a medium-sized trunk.

Resembling naphtha flakes in appearance and efficiency is paradichlorobenzene. No wonder moths and worms curl up and die before this thundering name even if it be taken in broken doses, thus, para-dichloro-benzene. Use in similar amounts to naphthalene.

Gum camphor has a more pleasing odor but is also less effective. One pound to every five cubic feet of space is sufficient.

Other protective measures include cold storage, which is perfectly safe, and several types of fumigation, some of which carry a fire hazard and all of which are much more troublesome to use than the above-mentioned methods.

Best of Country Clubs

WHEREVER two or three enthusiasts are agreed that no rural community should be without its garden club, they should lose no time in launching so admirable an enterprise.

The advantages are obvious. Such a club does wonders toward promoting general interest in gardening. The improvement in the aspect of already established homes attracts a desirable class of people who are on the lookout for a congenial location for a home of their own. Property values soon begin to rise.

The healthful occupation and social contacts are productive of much worth to club members. Yet sometimes the would-be leaders in such a movement are deterred by not knowing just what steps should be taken.

Let them invite a number of persons to meet for discussion and organization. These persons should include all who seem promising material for the success of the club, because of their interest in gardening, their executive ability, or their social influence. All of these tend to promote the welfare of a community undertaking.

A list of suggestions, the simplest and best I've seen, may prove useful. They are offered merely for your consideration. A full discussion may bring out better ideas.

"Officers: The fewest a club can get on with are a president, vice-president, secretary and treasurer.

"Executive committee: Comprised of officers and two members.

"Membership: Active and associate; interest in gardening sole condition.

"Membership committee: Anyone may propose a member. Election to consist of a unanimous vote of the executive committee.

"Dues: Payable yearly and should be light.

"Meetings: Where? How often held?

"Bureau of exchange: May be a single member whose business it is to arrange about the exchange of plants, seeds or cuttings between members."

To these may be added an official "adviser" to whom the less experienced may apply for aid in deciding what to plant and how to cultivate.

Periodical flower shows, preferably with prizes, will stimulate and maintain interest. Occasionally a meeting may be enlivened and made really valuable by engaging an expert to give a short talk, either on gardens in general or on some special phase of gardening. Radio talks that supply desired information may take the place of an individual lecturer.

On the whole, experience meetings among members are productive of the best results. Put your community in the class of those which have successful garden clubs.

When in Silk Milady Goes

CERTAINLY she's in silk, but is milady wearing the pure, lustrous thread of the mulberry-fed silk worm, or just plain processed wood pulp? Surely, if the material for her costume came from Japan, it must be the product of the industrious little spinners on the mulberry leaves. At least we used to feel that assurance.

Japan is the home of the silkworm and of the beautiful raw silks. Our faith, however, is rudely shaken by the information that she is expanding her already large artificial silk output from the present annual 5,000,000 pounds, in an effort to meet the insistent demand for 11,450,000 pounds.

This would seem to blast the hopes of our hard-pressed cotton growers. They may urge women to buy cotton frocks and an overload of muslin underwear, but "how you gonna keep 'em" in cotton clothes when the silken lure of Japan is doubled?

NO ROLLS ROYCE with uniformed chauffeur ever convoyed a prouder passenger than the vehicle which nearly ran me down the other day, on the street of an old southern city. Seated at ease in an empty orange box, mounted on minute solid wooden wheels, a little pickaninny, fairly doused in haughty superiority, held in her arms a pampered lap dog of nondescript yellow. The combined services of chauffeur and motive power were performed by a small colored boy who trotted meekly in the shafts.

Because the home should be the center of woman's world, that's no reason for it being also her boundary.

"The crack athlete dies young, the gardener lives until three score years and ten and seems a mere juvenile."

Not "For Children Only"

NEVER too late to mend! A cheery saying and partly true. Wholly true in that it implies the greater ease of applying the remedy early. Proverbs and practice direct attention to the young child. Training of mind and body are far more intensive in tender years than they become later on in life.

Discipline gradually relaxes until the age is reached when a man is called "his own master"—though no human being ever actually attained to that apocryphal state. After we become "free, white and 21," discipline is often given up altogether.

Observation shows that, though people submit to the discipline forced upon them, few have the determination to impose such discipline upon themselves. We all see very plainly that so-and-so should mend his manners, but, concerning that most interesting of all persons, namely, oneself, we are prone to see through a glass darkly.

The Well-Spring of Joy

No child is too young for his bodily needs to be considered, and his physical training begins almost with his first breath. We reach no great age before we realize that a feeling of well-being, of joy in mere existence and pleasure in our surroundings, depends vastly upon our physical condition.

If we are well and strong, our natural inclination is joyous. We are hopeful. If things go wrong, we estimate the annoyance at its true worth and make the best of it, expecting better luck next time. We can even conquer grief so far as to prevent its degenerating into selfish melancholy, irritability or bitterness.

On the Other Hand

It's hard to be happy with a headache. If there is pain or uneasiness in the body, everything becomes more of an effort. The exertion of attending to our daily duties is so irksome that we are worn out and fretful from fatigue. The children appear to be far more annoying.

Tried and true family jokes lose their wanted savor. Instead of greeting them with the hearty laugh that so promotes concord in a household, we find them flat and unprofitable. They even become acutely irritating if they are directed, ever so amiably, against ourselves. In this mood, no one is either attractive or happy.

These considerations alone should be sufficient to make sensible persons guard their health with due care. But when we add to them the discomfort, disabilities and pain that attend illness, we must realize that hardly any sacrifice is too great in order to attain and maintain physical health.

A Fourth Estate

And if the body can so affect our mental state, scarcely less does the mind affect the body. Most of us give less attention, I won't say to moral, but to mental health habits than to physical. Here, as in most matters, opinions differ. Some believe that no one can be entirely normal mentally unless he is well physically. Others reverse this and maintain that a man cannot be well unless he cultivates a healthy mental attitude. There's much truth in both views.

Conscientious parents are devotedly exercised for their children's health from the day of their birth, and as soon as a child is old enough to distinguish good from bad, his moral training begins. Few parents fail to instill ideals of honesty, truth, industry, etc., in the young. Their mental training is often relegated entirely to the school.

But there's still another field that appears to be rather neglected. It lies somewhere along the border land of character. It is manifested in behavior. Closely connected with mental, moral and physical conditions, it is yet more of an emotional manifestation—a sort of fourth estate vying in importance with the other three that are so much better recognized and more considered.

Living in Glass Houses

We hardly need a doctor to tell us that "thousands of men and women go through life with only a limited degree of usefulness because their minds are handicapped and clouded by unstable emotions." Unless your own parents were wise in guiding you to control such emotions, you are likely to be one of those thousands whose usefulness has been crippled.

If so, the task of saving your own children from a similar handicap becomes more difficult. Still it is not impossible, for, as has been noted, though your own ability to control your emotions would have been more readily established in your childhood, it is almost literally true that it is *never* too late to mend.

If you are not satisfied to give way weakly yourself where you wish your child to be strong, you will not spare yourself. The keen perceptions of youth will see through your pretense. It is doubtful whether an undisciplined mother can do much toward teaching her child self-control and self-direction, the two lessons which are so invaluable.

Discourage All Crankiness

We are told that the traits of disobedience, lack of control and contrariness are found in exaggerated form in most criminals. Personally, I've seen them quite fairly well developed in grown-ups who, though far indeed from criminal, were equally far from being acceptable companions.

Much may be forgiven to genius. It is not as a rule particularly well balanced. But we must remember that very few children, even the brightest, develop genius. What is considered merely interesting eccentricity in genius, is odd, cranky or even crazy in the general run of mankind. So rudeness may be excused as the amusing personal peculiarity of the very great man, but the rest of us simply "can't get away with it."

It is widely accepted that the time to fix a child in mental health habits is during the pre-school years. The plasticity of his mind is unquestionable at this period, and his artlessness makes it possible to detect the motive for his faulty behavior.

A Mother's Magic

"Patience, understanding and sympathy," urge those physicians who devote their study and attention largely to the mental and emotional needs of children. In what does a mother's magic consist but in love, patience, understanding and sympathy? Every mother stands ready to agree that little can be accomplished without endlessly exercising these qualities in behalf of the little ones.

Comprehension of the child's difficulty is essential. If he appears to be in conflict with his surroundings, he is probably sick (in which case the remedy is comparatively simple) or his trouble is deeper and more obscure. It is known that childish unhappiness or rebellion often results either from excessive demonstration of affection, which smothers him, or from cold unresponsiveness which chills and starves him at an age when his tender nature demands the expression of love and protection.

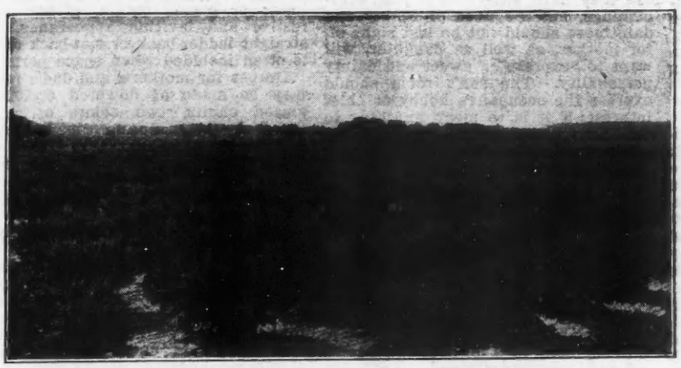
Fortunate is the mother whose child is naturally well-disposed. Her task is greatly lightened but should not be altogether disregarded. As a child grows older, it should be led to see that it must rely upon something more reasoned and firmer than mere sweet impulses. There is no one so perfect that his impulse is always a safe guide. It may fail lamentably under moderate strain.

Peach Grower, Watch Your Step

(*Continued from page 5*)

sults in shorter terminal growth and dropping of fruit, while later shortage of moisture prevents the fruit from sizing up satisfactorily. The increase in water-holding capacity of the soil by the addition of humus, supplied either by the use of manure or cover crops, is sufficient reason for not neglecting this important phase of orchard management.

One of the greatest possibilities for increasing yields and reducing cost per bushel lies, especially in the more southern districts, in a more intelligent use of fertilizers. Soil conditions naturally vary between the different districts and within the districts, so that the fertilizer best suited to the needs of one locality may not be the best for another. The need for nitrogen is common, however, all over the South, and any fertilizer used on peach trees should be high in this element. A five-year experiment in the Ozark foothills of central Arkansas showed a gain of 1.4 bushels per tree for the use of one pound of nitrate of soda and a gain of 2.1 bushels for two pounds of nitrate of soda per tree. No gains could be attributed to the use of either phosphoric acid or potash. Similar experiments being carried on by the experiment station at the present time, farther south in the state, indicate some benefit from the last named fertilizers. Fortunately, the addition of either phosphoric acid or potash causes no injury, so that their use, even if not needed, would be no worse than a useless expense, and there is little doubt that their use will be profitable on the lighter soils.



Hundreds of acres of peaches like this are growing in Howard country, Arkansas

Production Associated with Vigor

Production is directly associated with tree vigor. Cultural practices should be such as will afford an optimum growth. For maximum production, the average current growth will range from three to 10 inches on mature trees, and the longer shoots on the outer circumference of the top will range from 10 to 15 inches. Fertilization should never be so heavy on bearing trees that it becomes necessary to shorten or remove large amounts of terminal growth in pruning. Pruning should, ordinarily, be confined to thinning out new growth in the tops of the trees and just enough heading back of branches to keep the trees within bounds.

While there is little hope of any reduction in cost per acre, it is safe to predict that yields may be increased very materially, and as a result, the cost per bushel will be correspondingly decreased. Thus, the only possibility of reducing the cost of production is to increase the yields per tree and per acre.

With this increase in production, we are at once confronted with another problem. If yields are increased materially, the price which the grower will receive is liable to fall below present price levels. The problem of disposing of the crop looms proportionately large. For the next few years, the problem will be distinctly one of marketing. Not only methods of marketing, but markets must be studied. New markets must be established. Our real markets are the rank and file of people. We must give the consumer what he wants when he wants it and like he wants it. To do this, we must first determine these facts for ourselves and then tell the buying public what we have.

Conclusion

It is very evident to a close observer, or to anyone who will carefully study the situation, that peach growers are due to encounter at least a few years of low prices. The good growers will probably not lose money, in fact, they may be expected to make a little, but the marginal grower who cannot properly finance his operations will suffer. Orchards will be neglected, and a reduction of bearing trees, especially in the less favored areas, will result.

This must not be taken as a warning against any further planting of peaches. There are instances in which, due to especially favorable conditions to utilize labor more efficiently, etc., further planting may even be advisable, but these are individual cases. Under the existing conditions, it would seem obvious that any general increase in planting is inadvisable, and certainly any propaganda for the planting of large areas by people who not only know nothing of peach growing, but have no knowledge of fruit growing in general, should be discouraged. Such propaganda not only injures the individual concerned, but jeopardizes the stability of the industry.

"Watch your step,"

Apple Bulletin for Consumers

THE NEW JERSEY College of Agriculture has issued a bulletin which is designed to assist consumers in identifying the better varieties of apples.

This bulletin contains colored photographs of the five leading winter varieties grown in New Jersey. These are very fine photographs; in fact, the apples even appear to carry the original bloom as well as the color and markings. In connection with each photograph, a clear description in simple language is given of each variety. Information is also included as to when the different varieties may be found on the market. The merits of each variety for cooking, baking or eating out of the hand are also enumerated.

Prof. M. A. Blake, head of the Department of Horticulture of New Jersey State College, is the author. He points out that some beautiful varieties of apples are really quite inferior, whereas others which are not so beautiful are superior in quality. In writing the bulletin, Prof. Blake aimed to give consumers information that would assist them in recognizing the few superior varieties. It is hoped that the bulletin will be of value to consumers and that as a result producers will also be benefited in the direction of a better demand for the superior varieties of New Jersey grown fruit.

Any person interested in this bulletin may secure a copy by writing to the College of Agriculture, New Brunswick, N. J., for a copy of "Apples of New Jersey."

Thinning Fruit to Improve Quality

(*Continued from page 21*)

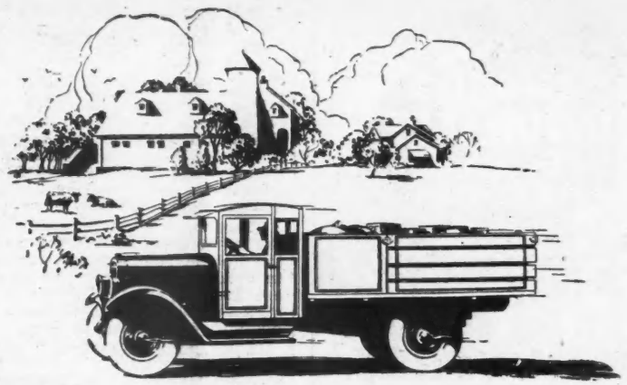
one hand and the fruit with the other, giving the fruit an upward twisting motion. However, shears designed especially for the purpose are preferred by some.

The time to thin varies with conditions, but in general soon after the June drop will give the best results. If delayed much after this time, the full effects will not be obtained. On the other hand, it is hardly practical to thin much earlier than this, for should a considerable June drop follow, the crop might be needlessly reduced. It should be remembered that the justification for thinning lies largely in the improvement of the crop thinned, and the practice must be applied with judgment.

Cost of Producing Apples

THE SHENANDOAH Valley is one of the most interesting apple producing sections in the United States. Frederick county, Virginia, is one of the most important counties of the district. It is significant, therefore, that a bulletin has just been issued by the United States Department of Agriculture which gives detailed information on the development of the industry, the types of farming followed and the cost of producing apples in this famous section and county.

The bulletin contains a great deal of very valuable information. Growers who are interested can obtain a copy by writing the United States Department of Agriculture, Washington, D. C., for Department Bulletin 1455. The bulletin was written by C. R. Swinson of the Bureau of Agricultural Economics.



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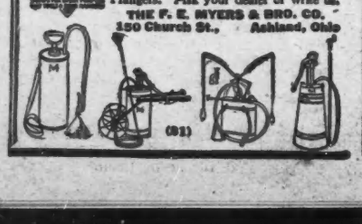

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Nitrogen Fertilizers in Peach Orchards

(*Continued from page 8*)

leaf called chloroplasts. These contain a green substance called chlorophyll, which, with the aid of sunlight, manufactures the product grape sugar, or in other words, carbohydrates. The healthier and larger the leaf area, the greater will be the amounts of carbohydrate manufactured.

There are other materials formed in the leaves, such as fats and proteins, the proteins being of great importance in building plant structures, but they are probably made directly or constructed largely from the carbohydrates by chemical addition.

In summing up, we find that the amounts of soluble carbohydrates stored in the tree from the past season, in addition to those that will be manufactured during the early part of the following season, determine largely (1) the growth of the tree; (2) the setting of fruit; (3) the size of the fruit; and (4) fruit bud formation. If the supply of soluble carbohydrates is large, these four factors will be affected accordingly, and the natural result will be an increase in yields.

There might be other benefits derived from nitrogen, such as making the tree more resistant to bacterial leaf spot, which has been experienced or observed by most growers. Since there is no direct remedy known for the disease, wonderful results have been obtained by keeping the tree in a healthy and vigorously growing condition, which tends to make the tree immune to the disease. Furthermore, nitrogen fertilized trees actually seem to be stronger than those that have not received an application.

Possible Injuries May Result

There is also a possibility of nitrogen causing injurious results, and it may be well to mention these. If the application has been too large, the tree may remain in the growing condition so long during late summer that its growth will be succulent and its tissues will not have matured by the time cold weather arrives. If this be the case, disastrous results may occur from winter injury. Small applications to newly set trees, immediately following planting or somewhat later, have resulted in serious root injury, possibly because the root system had not become established in the soil. Generally speaking, peach trees will receive enough nitrogen from the soil the first year without feeding them. Another bad effect in bearing is that the fruit does not color up well due to the heavy foliage not admitting a sufficient amount of sunlight. Nitrogen delays ripening from a week to 10 days, though this might be a desirable rather than an undesirable result, depending, of course, on market conditions.

As to the kind of nitrogen fertilizer to use, sulphate of ammonia and nitrate of soda are perhaps the most popular. Others, such as cyanamid, tankage and dried blood are sometimes used, but these, as a rule, are all slower in action.

One hundred pounds of sulphate of ammonia contain approximately 20.75 actual pounds of nitrogen, and nitrate of soda about 15 pounds. The latter is more readily available than the first and it can be readily used by the tree, since the nitrates are already present. Sulphate of ammonia must be acted upon by nitrifying bacteria before its nitrogen becomes available, but even so there is not a great deal of difference in the availability of the two. Experiments seem to show that nitrate of soda leaches more readily than sulphate of ammonia, while continual use of sulphate of ammonia tends to make the soil acid, but whether enough so to be of any direct harm to the trees, is doubtful. Sulphate of ammonia does not lump so easily as does nitrate of soda.

Price Is an Important Factor

Summing up the chemical and physical conditions of the two, there is not much to make one superior to the

(*Concluded on page 26*)

CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL

Rejuvenating the Old House

WE HAVE SEEN in the two previous articles of this series how, through the expenditure of a little money, together with considerable thought and time, we may greatly improve the living room, dining room, hall, kitchen, breakfast nook and bathroom. We shall discuss bedrooms this month.

The bedrooms, from their very nature, are the most personal and intimate rooms in the house. In fact, they are the proper place for the display of intimate pictures, photographs and other personal belongings of the members of the family and their guests. Each bedroom should express through its arrangement and furnishings the personality and tastes of its occupant. The room which would appeal most to the young daughter of the house would be done in pastel colors in pretty, dainty, graceful style. The room reserved for mother and dad may have more "substantial" furnishings, but the need of beauty and daintiness should not be lost sight of, for mother, as well as daughter, will want to "express" a sweet and dainty personality. The son's room should express the occupant's hobby or chief interest, if it is to mean anything to the boy. The guest room should fairly shout, "Welcome, make yourself right at home!"

Wallpaper Suggested

The walls, woodwork and floors would take their cue from the rest of the house. The woodwork should be enameled in ivory or gray, the floors painted or varnished, or waxed to give a smooth finish, in brown, tan or gray, as the case may be. The most suitable finish for walls and ceilings in the bedroom is a light-toned, pastel-colored, softly-patterned wallpaper. Spriggy floral or striped patterns in soft rose, blue, gray, lilac, pink or yellow are suitable for any type of bedroom.

The usual furnishings for the bedroom include a comfortable bed, a chiffonier or chest of drawers, a dressing table and bench or bureau, a bedside table, one or more well-cushioned chairs, rugs, a few good pictures, the necessary linens, window drapes and personal belongings. However, it isn't the furnishings, but the little extra touches, that give to each room its distinctive style.

May Refinish Furniture

We have said that mother's and dad's room should have a substantial air. This is true of any room shared by a man. But daintiness need not be entirely sacrificed to dignity. Heavy, dark, old-fashioned pieces of furniture are popular at the present time, so if you possess such a suite for the bedroom, you may use it just "as is," or, if it is marred and shabby, you may remove the old varnish and refinish it in dull-polished walnut. If your suite is golden oak, by all means finish it over in walnut. If you do not possess a "suite," but merely a collection of bedroom "pieces" of various designs and finishes, you can give them some relationship (cousins at the very least) by applying one or more coats of paint and enamel on all pieces to be used together. Suitable colors for enameling bedroom furniture would be soft gray, rich ivory, greenish gray, or putty color. They may be left plain or suitably decorated, as you wish. If the bureau is ugly in line, it may often be improved by detaching the mirror and hanging it separately from the picture mold, before refinishing the bureau. A mirror should also be hung above the chiffonier or chest of drawers at the proper height for the man of the house.

Twin beds are always sure-fire starters of an argument, but this article would not be complete if they were omitted. For those who really would sleep better by themselves, who have a spacious bedroom, and who can afford to purchase and completely equip two beds, each involving the approximate cost of one full-sized bed, twin beds would doubtless prove an ideal arrangement. Most people feel twin beds are not very companionable.

Include Sewing Rocker

Mother's room would be incomplete without her sewing basket or cabinet and a comfortable armless sewing rocker. The chair may be of reed, upholstered, or it may have pillows to match the drapes. Or the chair may be entirely covered with a fitted, pleated-skirted slip-cover of flowered cretonne or glazed chintz, giving it a festive and inviting appearance. A straight ladder-back or slat-back chair is often included when space permits.

Drapes for mother's and dad's room may be made of flowered cretonne, glazed chintz, two colors of voile, flowered net, dotted marquisette, dimity or crossbar, with ivory or white and pastel colors predominating. The cretonne and chintz are usually made up in the form of scalloped or pleated valances with straight or tie-back side panels, and with thin, white glass curtains in ruffled tie-back style. If the room is inclined to be dark, the valance could well be omitted in planning the drapes. Bedspreads may be of cretonne, chintz or unbleached muslin. Dresser scarfs and boudoir pillows should be sheer and dainty.

Pictures for the bedroom should be pretty, restful, and not overly large. The smaller ones may well be hung in groups. Candlesticks and candles will add a pretty touch to even the plainest of bedrooms. Lighting is important. Rose silk lamp or electric light shades cast a warm glow that will bring youth and beauty to the face of the occupant as well as to the room.

Girl's Room Dainty

Many of the ideas suggested for the parents' room will serve equally well for the young girl's room. Painted furniture, including a bed, bedside table with candle on it, straight or rocking chair, dressing table with bench, and chest of drawers or low cedar chest, are best for this room. The style of the furniture is unimportant—it's the finish that means so much. The girl may make herself a lovely dressing table by draping a narrow table or box of the right height and hanging a mirror above it. The "skirt" for the dressing table would usually be made of the same material as that used for the drapes, and might be of changeable taffeta, cretonne, glazed chintz, unbleached muslin, or even cotton crepe in suitable pastel colors. The bench for the dressing table would have a padded top and full skirt of the same material. The chair might have cushions or a slip-cover of the chosen material, just as the girl prefers. The dressing table may have a painted top with a suitable scarf or a piece of plate glass over it.

The window treatment is very important in this room, as the drapes are the keynote to the rest of the furnishings. The girl may use white ruffled tie-back curtains with valances

and side panels of prettily flowered cretonne, taffeta or chintz. If she is a jolly, peppy girl who is rather inclined towards sports, she may favor cretonne or chintz. If she is a fluffy, dainty miss, ruffled tie-back curtains of rose or blue voile or organdie without glass curtains may be more suitable for her room. If organdie or voile is used for curtains, she may still use a pretty floral patterned cretonne in harmonizing colors for the dressing table flounce and chair upholstery.

She will want several bedspreads. One of them should have a flounce to match the flounce on the dressing table. She will also want to make a collection of the fluffiest, daintiest, laciest, most enticing boudoir pillows imaginable. Then, with the addition of a gayly painted, two-shelf, handmade wall bookcase (one of the popular hanging ones), a braided rag rug or two, a few favorite pictures that harmonize with the color scheme, a waste basket, one or more pairs of candlesticks, a pretty lamp and shade, and her personal belongings, daughter's room will be complete.

Boy's Room Should Be Pleasing

Oval woven or braided rag rugs are entirely suitable for the guest room. Two or three small rugs laid in the places where needed most will be all the floor covering needed. Pictures and wall hangings, candlesticks, a desk set with quill pen in colors to harmonize with drapes, books, freshly cut flowers, and dainty dresser scarfs and bedspreads are all that are needed to complete the guest room.

Plain painted furniture in orange and blue, gray, lettuce green, or orange and black would be more acceptable to the average boy than any other kind. In fact, with the proper person to inspire him, he will take great pride in "doing over" his bedroom furnishings himself. The wallpaper, woodwork and accessories should harmonize in color with the furnishings. The boy's room should not be overcrowded. A single bed with patchwork quilt or Indian blanket for top cover, a chest of drawers with mirror above, a study table and built-in or portable writing desk, one straight chair, and possibly one upholstered chair are all the furnishings that will be needed or wanted.

Here, sonny should find sanctuary for all his personal belongings—his boxing gloves, guns, fishing rods, baseball and football togs, tennis racquet, etc. Let him select his own pictures for the wall, and he will appreciate them more than any "wished on him" by grown-ups. He would doubtless like a fur rug beside his bed, but such things are not especially sanitary. A good reading lamp would be about the only "accessory" sonny would care about. Plain, inconspicuous curtains of white or orange crossbar or marquisette would be most suitable.

Make the Guest Room Inviting

The guest room should have a cheerful, inviting air, which at the same time sacrifices neither daintiness nor dignity. The most desirable furnishings would be in walnut, but painted furniture would serve very well. In addition to the usual bed, bedside table, dressing table or vanity with bench, and chest of drawers with mirror above, a small writing desk with straight ladder-back or Windsor chair, a comfortable, lightly upholstered easy chair, and a hanging wall bookcase with a few interesting books on its shelves, will each add greatly to the comfort and enjoyment of your guests.

Drapes and flounces for dressing table and bed would be most suitable and effective for the guest room if made of changeable taffeta in a pale rose and green, or pale orchid and green with a touch of rose. Taffeta is rather expensive, however, so a carefully chosen cretonne in pretty but not too "jazzy" colors and pattern, or a flowered glazed chintz in rose, orchid or blue may serve the purpose with equally good effect.

In general, we must not neglect to mention that each bedroom should have its own clothes closet in a properly arranged house. The closet should have a tier of shelves across one end, a drawer for shoes on the floor, and a hanger rod across it lengthwise. The ideal closet is arranged to secure ventilation and good light when needed. Somewhere in the house a linen closet must be located for the convenient storage of household linens. It may be in the bathroom, in a central hall, or in one of the bedrooms.

Provide Comfortable Beds

It is also proper to say a word or two about beds. There are beds—and beds! Too many families struggle along with sagging springs, hard, lumpy mattresses, too short sheets, and hard, unyielding pillows. They don't even know they can have better. And when it comes to beds, that's one place where the best is good economy! Spend a little money for double coil springs, silk floss mattresses, goose-feather pillows and extra long sheets (long enough to tuck in well at head and foot, and thus prevent wrinkling). Install new beds all around, and just see if the family doesn't take a new lease on life after really resting for a few nights.

In the "Chats" department of the June issue of the AMERICAN FRUIT GROWER MAGAZINE, we shall complete the series of articles on the "Rejuvenation of the Old House."

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Strawberry Recipes

AGAIN we rejoice as the strawberry season rolls around. At least the Editor of this page rejoices, and she has every reason to believe that her readers share the feeling. If the long-suffering American public was not already afflicted with so many different "weeks," we should be tempted to use our editorial influence to have a "week" set aside for the glorification of King Shortcake and his Cohorts. But, we'll do even better than that—we'll give a set of recipes this month which will enable each family to properly celebrate for a whole season instead of for one little week only.

Strawberry Shortcake

Prepare a short, unsweetened baking powder biscuit dough, and bake in two layers (in the same pan with butter between the two layers). Baking in this manner prevents the "cake" from being too crusty. While baking the "cake," prepare the fruit. Wash, hull and drain the berries, mash lightly and add sugar to taste. Let stand with sugar until ready to serve. When cake is baked, remove from oven, split layers apart, butter lightly and cool. Assemble the cake just before serving, with a layer of fruit on top. Serve with thick cream. A more festive looking shortcake is put together and garnished on top with whipped cream, together with whole berries, but the plain thick cream is preferred by true lovers of shortcake.

Strawberry Salad

Wash, hull and cut 1 pt. of selected strawberries in halves, lengthwise. Sprinkle with powdered sugar, cover and let stand in ice box or other cool place until thoroughly chilled. Arrange nests of heart lettuce leaves for individual service, fill with fruit and cover with whipped cream to which salt, paprika and mayonnaise dressing has been added. (Allow 1 c. whipped cream to ½ c. of mayonnaise.) Garnish with halves of strawberries and chopped nuts.

Strawberry-Cheese Salad

Wash, hull and cut selected berries in halves lengthwise. Sprinkle with powdered sugar to sweeten. Let stand in ice box or other cool place until chilled. Arrange for individual service on a bed of lettuce leaves, placing halves of berries in a circle. Heap cottage cheese in center of circle, taking care not to completely cover the fruit. Garnish with a dash of paprika or a half of a strawberry. Serve at once.

Strawberry Pudding

½ c. butter	½ c. milk
1 c. sugar	1¾ c. flour
1 egg	3 t. baking powder

Mix in usual manner for butter cakes, by creaming butter, adding the sugar gradually and the egg well beaten; then sifting flour and baking powder, and adding flour alternately with milk to first mixture. Turn batter into buttered shallow cake pan and bake 25 minutes in moderate oven. Cut in squares and serve with fresh strawberries which have been sweetened to taste and slightly crushed. Serve with plain thick cream or whipped cream.

Strawberry Pie

Wash, pick over, and hull fresh strawberries, allowing about 1 pt. for a pie. Sprinkle generously with sugar and let stand while the pastry is being prepared. Make a rich pastry (sufficient for two crusts) and line deep pie pan with flaky pastry. Fill with fruit, add more sugar if necessary, dot with bits of butter, and cover with upper crust. Press edges of crust well together with fork or palm of hand, moisten crust lightly with milk or water, and bake in hot oven for first 10 minutes, then reduce the heat and bake slowly until fruit is cooked. Some cooks prefer a lattice-work upper crust and obtain excellent results.

Strawberry Whip

1¼ c. strawberries 1 c. powdered sugar
White of 1 egg

Wash, hull and drain berries. Crush fruit, and put all ingredients together in large bowl. Whip with wire whisk until stiff enough to hold in shape. About 30 minutes will be required for the beating. Line a dish with lady fingers or strips of sponge cake, pile mixture lightly in dish, chill and serve with whipped cream or boiled custard sauce.

Canned Strawberries

Pick over, wash and hull strawberries, arrange in sterilized jars, taking care not to crush the fruit, and fill with syrup. For the syrup, allow 1 c. of sugar to 1 qt. of berries (more may be needed if the fruit is unusually tart). Place sugar in a preserving kettle with sufficient water to dissolve sugar, and bring to a boil. Distribute syrup equally between jars of fruit and fill jars to the top with warm water. Put lids in place and place jars on rack in boiler or pressure cooker. Strawberries require very little cooking, 12 minutes after coming to the boil being sufficient for the wash boiler method, and about 5 minutes for pressure cooker method. Cool fruit and store in cool, darkened room.

Strawberry Ice Cream I

3 pts. thin cream	2 c. sugar
2 boxes berries	Few grains salt

Wash and hull berries, sprinkle with sugar, cover and let stand for 2 hours. Mash and squeeze through cheesecloth, then add salt. Freeze cream to the consistency of a mush, add gradually the fruit juice to prevent curdling, and finish freezing. Rich Jersey milk may be substituted for cream.

Strawberry Ice Cream II

1 qt. berries	1½ c. milk
1 c. sugar	Whites of 4 eggs
1½ c. heavy cream	⅛ t. salt

Wash, pick over, hull and mash the strawberries. Sprinkle with sugar, cover and let stand several hours; then squeeze through a double thickness of cheesecloth. Mix cream, milk, whites of eggs (beaten stiff), and salt. Freeze milk mixture to a mush, add fruit juice and continue freezing. If the fruit is very acid, more sugar may be necessary.

Table of Abbreviations

1 t. equals 1 teaspoonful.
1 T. equals 1 tablespoonful (3 t.).
1 c. equals 1 cupful.
1 pt. equals 1 pint (2 c.).
1 qt. equals 1 quart (2 pt.).

All Measures Level

If aluminum cooking utensils become discolored, they may be cleaned by cooking acid foods in them

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Nitrogen Fertilizers in Peach Orchards

(*Continued from page 24*)

other, except that it must be remembered that sulphate of ammonia contains approximately 25 per cent more available nitrogen per 100 pounds than does nitrate of soda. In purchasing them, prices must be considered accordingly.

Time of Application.

As to the time of application of commercial fertilizers to bearing peach trees, there seems to be a more or less definite time limit in which to apply them. About the time the buds are breaking, or two or three weeks before blossoming, is the time that has been generally accepted.

The amounts to apply naturally vary according to soil conditions and age of the trees. Generally speaking, a tree 10 years or older should be greatly benefited by two and one-half to three pounds of sulphate of ammonia, using nitrate of soda in proportion; some growers use even more than this. In young orchards that are not bearing and in which an increase in growth is desired, one-fourth to one-half pound gives wonderful results.

Perhaps nothing needs to be said regarding the method of application, except that the material should be applied in a broad circle to the area that contains the feeding roots, which is approximately under the outer limits of the branches or a little beyond.

There is one more point that is of great importance regarding the use of nitrogenous fertilizers, and that is that they cannot be used as substitutes for cultivation and the turning under of organic matter, such as manures, and cover crops. These are absolutely essential if the soil is to be kept in a good physical condition and therefore must be adhered to in connection with nitrogen fertilizers.

Summary

Peach trees respond very noticeably to nitrogenous fertilizers.

Nitrogen determines the amount of soluble carbohydrates, and carbohydrates in turn determine the growth and yield of the tree. Stating this conversely, nitrogen is the key to a high percentage of carbohydrates.

Sulphate of ammonia and nitrate of soda are the most popular nitrogen-carrying fertilizers for peach orchards.

Judgment must be used in their application to avoid disastrous results, such as winter injury following an over-supply and late application.

Applications to newly planted trees may show injury to the root system, and such practices should be avoided.

Nitrogenous fertilizers should not be used as substitutes for other important features in orchard management.

The use of manures and cover crops in connection with these fertilizers to keep the soil in a good physical condition cannot be over-emphasized.

New Jersey Growers Should Use More Lime

THE SOILS department of the New Jersey Agricultural Experiment Station recommends that New Jersey farmers and fruit growers use more lime. Less than one and one-half tons of lime are being used annually on each farm in New Jersey. This means that on the average only eight acres are limed on each farm once in four years. Since the average New Jersey farm contains 64.9 acres, one-eighth of the farm land is limed once in four years. New Jersey soils are usually acid and need lime for best results in the case of a large number of crops.

Power of the Press

"Do you find that advertising brings quick results?"

"I should say it does. Why, only the other day we advertised for a night watchman and that night the safe was robbed."

Engineering for the Fruit Grower

By E. W. Lehmann

The Effect of Poor Drainage

THE MOST disastrous effect of poor drainage is the entire loss of the crop or a reduced yield. Lack of good drainage always delays planting, retards the growth and reduces the efficiency of the operator in doing the field work. While the reclaiming of more land for farming purposes is not a popular project just at present, the individual farmer cannot afford to neglect the drainage of wet spots in his fields.

Efficiency and economy in production will always play a large part in determining the success of the individual farmer. In nearly every section of the central, southern and eastern states, there are many good farms where it is impossible to produce efficiently and economically in certain fields due to wet spots. These areas, which are often relatively small, should be drained whenever the cost is not out of proportion to the benefits that may be derived. While labor and power are the two big items of expense, the yield always is a factor in cost of production. Good drainage is essential to big yields. An estimate of the amount of benefit that may be derived from drainage can best be determined by comparing its previous production with the production on similar land nearby that is well drained.

The fertility of a piece of land and its location should be two determining factors in deciding whether or not it should be drained. While increased production is all important in justifying the expenditure of funds for such work, yet the matter of convenience in doing the field work where there are no wet spots, the ease of handling all machines and the saving of time should not be overlooked.

During the spring of the year, drainage problems are always most in evidence. Temporary relief may be had by surface ditches, but such ditches are objectionable. In most cases they might well be called a necessary evil. Tile drains are the most satisfactory. They remove the surplus water without interfering with the necessary operation on the surface of the soil. In carrying the water through the soil, tile drainage promotes aeration, which is desirable for plant growth, and reduces the loss of fertility by surface washing to a minimum.

Size of Tile

The size of the main tile should be carefully determined on the basis of the area to be drained and the amount of slope. Usually tables are provided in circulars obtainable from some of the state experiment stations which make it easy to determine main tile sizes. The laterals are usually either four or five inches in diameter. The spacing and depth varies under different soil conditions.

Porosity of Tile No Advantage

The principal requirements of good tile are that they be dense, strong, well-burned and uniform in shape. Practically all of the water enters the drain tile at the joint of the tile, that is, at the spaces between the tile where they are butted together. The amount that passes through the walls of tile is of no special consequence. A good many people have the wrong impression on this point. It should be remembered that porous tile, of either clay or concrete, are not desirable. If such tile are exposed to the weather, they quickly disintegrate.

Cost of Drains

While the cost of any construction work varies in different localities, a fair estimate of the cost of putting in five-inch lateral tile can be made at $100 for 1000 feet. This is the entire cost, including tile as well as labor. For a few hundred feet, the cost would no doubt be more per foot. Where larger tile are installed, the services of an engineer should be secured, All tile drainage should be carefully done to avoid trouble later.

Using Horses to Advantage

PLOWING is one of the greatest power consuming operations on the farm. To use power efficiently in the job of plowing, it is essential that the side draft be reduced to a minimum. Side draft always occurs to a large degree in plowing when four or five horses are hitched abreast. To eliminate this condition, the teams should be hitched in tandem with three horses to the plow and two in front.

What Side Draft Is

To avoid side draft, one must know what it is and when we have it. When a team is hitched to a plow and exerts a pull, we know that before the plow moves forward through the soil, the resistance to the plow, or the draft, must be overcome. The line of draft of a single 14-inch plow is a line extending from a point on the moldboard about 19 inches from the center of the previous open furrow, and parallel to it. The line of draft of a two-bottom 14-inch plow is a line passing approximately 26 inches from the center of the furrow.

The line of pull of a four-horse team is a line midway between the center horses. If the outside horse walks in the furrow and the horses are spaced 30 inches apart, the line of pull will be 45 inches from the center of the furrow. From this discussion, it can be clearly seen that if a team of four horses were hitched abreast 30 inches apart to a two-bottom 14-inch plow, they would not be pulling straight away, but would be pulling to one side by a distance equal to the difference between 45 inches and 26 inches, or a difference of 19 inches. This is known as the side draft.

Tests have been made which indicate that 19 inches of side draft on a two-bottom 14-inch plow may increase the force that must be exerted by the team as much as 25 per cent more than the team need exert if the line of pull was directly over the line of draft. In addition to this added draft, the team pulls at an angle which is objectionable. The side draft with the four horses abreast may be eliminated by putting the horse in the furrow, on the plowed ground. This is not satisfactory.

The real solution is to hitch the horses in tandem and spread them sufficiently with a long doubletree so the line of pull will be directly over the line of draft. Hitching in tandem makes it possible to work as many as six horses, three in front and three behind, without much side draft. Or five horses may be used, with two in front and three behind.

A Good Whitewash

WHITEWASH has long been a substitute for paint in making the buildings more attractive about the farm. At regular intervals we have a request for a good whitewash formula. Whitewash is not only used to advantage for outside work, but it may also be used for inside work, especially in the poultry houses and to brighten up otherwise dark basements. This material is inexpensive and has a certain value from a sanitary standpoint.

A whitewash formula that was recommended to me by Prof. W. A. Foster, who is in charge of the farm building work at the Illinois Agricultural Experiment Station, as being very satisfactory for new surfaces is as follows: Use two and one-half gallons finishing lime, two gallons white Atlas cement, two and one-half pounds sal soda, two pounds table salt, and three pounds powdered alum. Mix dry and add cold water until diluted to make five gallons of the wash.

For old surfaces, use the following mixture: Two and one-half gallons finishing lime, two and one-half gallons white Atlas cement, one pound sal soda, one pound table salt, and three pounds powdered alum. Mix and dilute to five gallons. Apply in the usual manner, after cleaning off loose particles and scales.

The caution that should be kept in mind in applying whitewash is to be sure that the surface on which it is applied is entirely clean before the application is made.

Cold Water Paint

COLD WATER PAINT is inexpensive when compared with ordinary paint, and for inside work, it is a very good substitute. This paint is bought in the form of a powder at a few cents a pound, and is simply mixed with cold water and applied with a brush or a spray pump in about the same manner as whitewash is applied. This sort of paint does not seem to flake off, nor does it rub off to as great an extent as whitewash.

During the past winter, we applied a coat of cold water paint to our basement wall, and it was a joy to us all because the basement was so much lighter and more pleasant. This sort of paint can be tinted if desired and used to advantage in refinishing other rooms in the house. During the spring clean-up will be a good time to try it out.

Making the Tractor a Better Farm Power Unit

THE DEVELOPMENTS that have taken place in tractor design during the past 10 years are truly remarkable. From an experimental machine introduced a few years ago, we now have a standard piece of farm equipment without which many farmers would not attempt to farm. Each year the tractor designers are finding new ways of making the tractor serve the farmer more efficiently. Many new attachments are being provided and are proving to be labor savers. One important attachment which makes the tractor a better servant is the power take-off.

While the power take-off has not been standardized in all its details, it is being rapidly adapted to drive many farm tools. Spray pumping outfits are being built to be driven by the tractor power take-off. In this way, the tractor pulls the machine and also drives the pumping mechanism, which saves the cost of a portable engine ordinarily mounted on the sprayer. Binders, mowers, combined harvesters, potato diggers and the like are being driven by the tractor power take-off, with the result that the total power requirements are less than when driven by the common "bull wheel," and the machines are operated more steadily and more efficiently.

The power take-off consists of an extension shaft fitted with couplings and universal joints which make it quite flexible. It is designed so that the machine connected to the power take-off is driven either while the tractor is standing still or while it is moving forward. It puts the control of the entire mechanism in the hands of the tractor operator.

The power take-off has certainly extended the use of the tractor to a greater number of operations and has thereby resulted in its being of greater economic value to the farmer. There is little question but that the number of hours a tractor is used determines to a great extent the cost required per hour to operate it.

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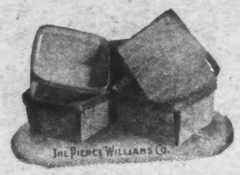

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FOR GUERNSEY OR HOLSTEIN CALVES, practically pure, write Edgewood Dairy Farms, Whitewater, Wis.

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FROSTPROOF CABBAGE AND ONION PLANTS; large rooted, quality plants; all varieties; quick shipment. Postpaid, 500, $1.00. Expressed, 75c thousand. Hollywood Farms, Pavo, Ga.

PLANTS, LARGE, OPENFIELD GROWN, LEADing varieties. Cabbage, 75c, 1000; collard, 75c; tomato, $1.00; Porto Rico potato, $1.75; Bell pepper, $1.50; onion, $1.25. Good plants, prompt shipment. Quitman Potato Co., Quitman, Ga.

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WANTED—THE FOLLOWING NUMBERS OF the American Fruit Grower Magazine: February, 1917, Vol. XXXVII, No. 2, and September, 1921, Vol. XLI, No. 9. Will purchase. Address C. S. Bean, Agricultural Library, University of Wisconsin, Madison, Wis.

Bee Keeping for Fruit Growers

By H. F. Wilson

Swarm Control

SWARM CONTROL used to be a very important matter for discussion at all bee meetings. However, in more recent years, it has been found that, under normal conditions, swarming can be prevented to a large degree by the simple addition of more room during the brood-rearing period in the spring. If you have experienced continued difficulty with swarming, it must be because your bees did not have sufficient room during the spring period. A good practice to follow is to see that the bees have more room than they can use at all times. Normally, in the northern latitudes, each colony of bees of fair to good strength should have an extra brood-rearing chamber, about May 1. If you are using modified Dadant or Jumbo hives, it should not be necessary to give additional brooding space. On the other hand, if you are using eight or 10-frame hives, a second hive body should be added to each colony of bees as soon as six frames are found to contain brood. If the extra section is not added until after the bees have developed an inclination to swarm, the additional room will probably not be very effective. After bees have once developed the swarming instinct, it is almost impossible to keep them from swarming, except by special manipulations, such as breaking up the brood chamber and shifting a part of the comb, either to another part of the hive, or to a separate hive on another stand.

Controlling the Mating of Queen Bees

OUR READERS will be interested to learn that at last a successful method for mating queen bees by controlled artificial methods has been discovered. Two or three different men seem to have discovered a somewhat similar method at about the same time. G. H. Cale reports in the *American Bee Journal* for November, 1926, that Lloyd R. Watson, a beekeeper and scientist of Alfred, N. Y., has worked out a practical method for mating queens by hand.

In the near future, we may expect all of our queen breeders to be following such a plan in developing their breeding stock. In years to come, this should be of great benefit to the beekeepers, because it will be possible to breed strains of bees that are good honey producers and which at the same time are more gentle than most of the strains that we now have.

National Publicity for Honey

THE AMERICAN Honey Producers' League is starting a "National Honey Publicity Campaign," which should be of extreme value to the honey industry in general, in that it will help to dispose of the surplus honey crop now on hand, both in the eastern and western states. Every individual beekeeper can help in this program, and we hope that the readers of the AMERICAN FRUIT GROWER MAGAZINE will take an active interest in this campaign. Although you may not be a member of the league, you can individually carry on a local campaign in your own behalf. Fifty members of the league have been appointed on a committee to develop this campaign. The United States is divided into 10 regions. There will be one national chairman and a sub-chairman for each one of these districts. Then there will be a member of the committee appointed for each state. The members of this committee will get together publicity material regarding bees and honey, and this material will be distributed to individual beekeepers for use in local papers. Any member of the league is entitled to the use of this service. If you do not belong to the league, there is no reason why you should not prepare such publicity articles for yourself and make an effort to have your local papers use two or three or more of these during the coming year. Such articles should deal with the food value of honey and popular uses.

The writer has just visited the Pacific Coast, and inquiries throughout the West and Middle West indicate that there is a considerable amount of honey on hand that remains to be disposed of during 1927. We, therefore, suggest to our beekeepers that they do not increase the number of colonies, as it is quite apparent that there is an over-production at the present time and that a normal condition can only be brought about by decreased production until a more staple condition can be reached. Campaigns for eating more of this, that and the other thing are being continually developed, and new food products are appearing on the market constantly. The staple products remain the same, but they are constantly appearing in new forms, to meet the ever-demanding requests on the part of the public for something "different." Honey can be kept before the public only through constant advertising. Since there is no possibility of a national advertising campaign being conducted by any individual firm, it is necessary for the beekeepers to do their own advertising individually and collectively.

We have constantly urged our beekeepers to allow their honey to become thoroughly ripened on the hive, then to strain it so that no particles of dust or wax remain. Pack it in clean, standard containers, and have neat and clean labels. With such a product, the dealers can go to the public with a knowledge and faith that the product is of the best grade and is worthy of his efforts as a salesman. With a good product in standard containers, every beekeeper can well afford to put on a local publicity campaign such as has been suggested.

The National Beekeepers' Convention in 1928

THE AMERICAN Honey Producers' League will hold its annual convention at the Hotel Whitcomb in San Francisco on January 25, 26 and 27, 1928. A round-trip fare will be available, making it possible for our beekeepers to make a tour of the Pacific Coast and points between. This is a splendid time of the year to visit the Pacific Coast and, even though you may not be a member of the league, any individual who wishes to do so, will be free to make the trip and to attend the convention. Arrangements will be made for a special car to leave Chicago in time to reach San Francisco for the beginning of the convention. If any individual beekeeper and his family are interested in making this trip, you may obtain the details by corresponding with C. L. Corkins, secretary, Laramie, Wyo.

Customer—You said this blanket is all wool and yet you can see it is plainly marked cotton.

Clerk—Well, you see we marked it cotton to fool the moths.—*Drexerd.*

Handling the Orchard Soil

(Continued from page 7)

more level parts of northern Ohio than in the hilly lands of southern Ohio, probably because the mulch material is much more available in the former. That orchards seeded down and mulched have not always been successful should at once be granted. The reason for this may not be evident in all cases. Surely, no one should become so wedded to any system that he will refuse to adopt another if the trees show that all is not going well. It has been shown repeatedly that an orchard which has been in the mulch system for a number of years can be plowed (shallow) or disked without harmful effects. Sometimes the trees will have a pale color the first year after plowing, but often no checking of any kind is noticed.

The ideas of the originators of this system (Mr. Vergon of Ohio and Mr. Hitchings of New York) were, we understand, that it would provide the conditions existing in the forests where trees are long-lived and vigorous. Several advantages have been claimed for it over any system of tillage, but it is sufficient to know that for as much as 30 to 35 years apple orchards have been continuously under the mulch, and the condition of the trees and yield has been satisfactory. In most cases, nitrogenous fertilizers should be applied annually. Acid phosphate distributed between the rows of trees during the early years of the orchard often materially improves the grass growth, which in turn is used to supply mulch.

Some of the objections to this system are serious and have been the cause of the loss of many trees. One is the liability of fire, and provision should be made to stop the run of a grass fire should it get started. Furrows plowed on the windward side and occasionally through the orchard at the time when fires are likely to occur will help materially. The mulch should be applied beneath the outer branches only and the area near the trunk kept clear. The occasional pasturing of hogs in the orchards will help in destroying mice and it reduces the likelihood of injury from this cause, but provision should always be made to poison the mice if they are numerous. In a few localized places, a new insect pest is proving serious where orchards are in grass or mulch, which is known as the apple flea weevil, as mentioned above. This insect perforates the leaves, and when it becomes serious, defoliates the branches and they eventually die. Entomologists who have made a thorough study of its habits tell us that the only remedy is to plow the orchard and destroy all the grass growth beneath the trees. That this can be done and the orchard rejuvenated has already been demonstrated by Houser of Ohio and Flint of Illinois.

Yield from Mulched Trees

Many figures have been published which show the relative value of sod grown trees, those that are mulched and those grown under tillage. The following comparison has been in progress at the Ohio station since 1915, when 24 trees were set in plowed ground and 24 in sod and a mulch program instituted: Cover crops of soybeans or rye have been used in the tilled plots each year, but no fertilizer was added until 1924, when half of each plot was treated. An equal number of Stayman and Delicious trees was used in each section. The following figures, reported by Ellenwood, summarize the results to date, giving the average yield per tree since they have been in bearing:

YIELDS FROM CULTIVATED AND MULCHED PLOTS

	Cultivated plot.	Grass mulch plot.
	Pounds	
Stayman	1,534	1,552
Delicious	916	656

The costs of growing the trees from the time of planting to and including the season of 1926 were:

Cultivated plot—$8.73 per tree.

Grass mulch plot—$6.69 per tree.

This cost account includes cost of the tree, planting, pruning, spraying, plowing, cultivating, mowing, mulch and mulching, and cover crop seed. Interest on investment and land rental are not included. These cost items would vary as large areas were being studied and in different localities, and they may be of greater value from a comparison standpoint than as actual indexes of cost.

Tillage and Cover Crops

Just as it seems unnecessary to try to show that sod orchards are usually low in vigor and productiveness, so it seems equally superfluous to show that tillage is beneficial. In many sections, orchard cultivation is so successful and well adapted to the conditions that the grass mulch system would not be considered, and rightly so. All the benefits that accrue to any other crop from stirring the soil applies equally to fruit trees. Such trees make a favorable response in vigor of tree and usually in productiveness. The important element—nitrogen—is usually abundant in the nitrate form during the active growing season.

The findings in the laboratory substantiate the field experience that early cultivation is important. It has been repeatedly mentioned in the columns of this paper that abundant nitrates in the early part of the season provides for the tremendous activity of the tree at that season. If tillage is delayed until mid-June, much of the benefits from that season have been lost. In fact, so striking is the value of tillage that in many orchards, probably in most apple orchards, the addition of fertilizers shows no increase in growth or yield, at least for a number of years.

Exceptions do occur to this usual experience in places where the land is low in organic matter and native fertility, in which case nitrogenous fertilizers may give as good results as in sod orchards.

As trees get larger and the outer branches interfere with cultivation, it often becomes desirable to seed down the tree rows or allow them to grass over without seeding. The area beneath the trees can be mulched and fertilized and only the lands between the tree rows cultivated. This avoids the rubbing and breaking of branches which occurs when one tries to cultivate up to and under the trees. This type of strip cultivation is the opposite of that which is sometimes followed with young trees. In this latter case, a few furrows are plowed on each side of the row of young trees which is cultivated, and a cover crop of oats or some other crop is used that will not become a menace about the trees. In this way, the grass is cut in the intervening areas for a few years and the cultivated strip widened as the trees spread. A still different arrangement that works well is to plow every other land and leave the odd ones in sod, which is kept cut. After a couple of years the order of tillage is reversed; this method keeps half the orchard in cultivation and half in sod. In this way, it is possible to get down the sod rows no matter how wet they may be, and this is often an advantage in hauling out brush in early spring and when spraying.

A Legume Sod

There is a fundamental difference between a legume sod and one composed of grasses, as has been pointed out previously. An orchard planted in alfalfa, sweet clover, or other clover mixtures makes a notably better growth than one in timothy or blue grass. This is demonstrated in the western orchards and has been shown time and again in the East. Stewart, in Pennsylvania, demonstrated this fact a dozen years ago, and the practice is beginning to spread even in sections where it was doubted whether alfalfa could be easily established. That station now reports that this orchard without any fertilization has done about as well as sod trees receiving heavy applications of nitrogen or cultivated trees both with and without fertilization. The secret seems to lie in the nitrogen relationship which is very favorable under the legume sod.

Peaches and Other Stone Fruits

What has been said pertains largely to the apple, for this fruit permits of a somewhat greater range of treatments than do the stone fruits. The peach in particular requires cultivation and fertilization. There are a few orchards in alfalfa or sweet clover in Ohio in which the peach is being successfully grown, but usually some disking is done in the spring. The mulch system has been used with the peach at different times, but the orchards did not prove to be long-lived or as vigorous as where tillage was followed. It is essential that this fruit be kept in a vigorous growing condition both for fruit production and to overcome such troubles as *Bacterium Pruni*, which is serious in some eastern peach sections. The fertilizer treatments involved with these fruits are really a part of the cultural treatment, but they will be considered separately in the next article.

Cherry Leaf Spot Control

THE RESULTS of a series of cherry spraying and dusting experiments extending over a four-year period show that liquid lime-sulphur is the most satisfactory material for summer applications on cherries in Michigan. The following schedule of applications is recommended:

1. Just after the petals have fallen.
2. Ten days to two weeks after petal-fall.
3. Four weeks after petal-fall.
4. Just after harvest.

Liquid lime-sulphur should be used at the rate of three gallons in 100; to each 100 gallons of diluted spray add two pounds or more of lead arsenate powder. The foliage of sweet cherries is susceptible to foliage injury and for use on them, lime-sulphur should be diluted at the rate of two gallons in 100.

These experiments have shown that lime-sulphur will control leaf spot; that there is little danger of foliage injury from its use on sour cherries; and that it does not seriously reduce the size of the fruit. Bordeaux has excellent fungicidal properties but frequently causes severe foliage injury and may also cause the fruit to be small. The use of sulphur and copper dusts has not occasioned foliage injury in this series of experiments and the size of the fruit has not been seriously affected, but the dusts have not controlled leaf spot satisfactorily in seasons when conditions were favorable for its spread.

Heavy defoliation usually occurs on unsprayed or on poorly sprayed trees when leaf spot is present in epidemic form. This loss of foliage may result in the death of the trees but more frequently weakens rather than kills them. The production of fruit in the year following defoliation is usually seriously reduced. This lower yield is the result of both fewer and smaller cherries. Furthermore, the growth of wood and leaves is reduced, fewer new spurs are formed, and there is a general slowing down of the trees' activities that may be registered in lowered yields for years to come.—*Michigan Extension Bulletin* 42.

That's Tellin' 'Em

Ardent Suitor—This ring I offer you is a symbol of the love I bear for you. It has no end!

Haughty Damsel—It is also a symbol of the love I bear for you—it has no beginning!

Tom—Pa, you remember you promised me $5 if I passed in school this year?

Pa—Yes.

Tom—Well, you ain't gonna have that expense.

Pipe Smoker Enjoys Can of Tobacco Sixteen Years Old

Railroad agent uncovers can of certain tobacco that had been lying in baggage room since 1910

Of course, all good tobacco is aged before it is packed, but here is a case of "aged in the can."

On the strength of Mr. McDonald's letter we certainly owe our packing department a vote of commendation. For no tobacco could retain its flavor and goodness lying in a dark, musty corner for sixteen years unless it had been properly packed in an absolutely airtight can.

So while someone was deprived of this particular can of tobacco for sixteen years, it did provide smoke enjoyment for an appreciative railroad cashier when it finally came to light.

Mr. McDonald's letter is reproduced below:

Waxahachie, Texas.
May 18, 1926.

Larus & Bro. Co.,
Richmond, Va.
Gentlemen:

The agent while going through his plunder stored in our baggage room came across a can of your tobacco, and on account of his not using a pipe he made me a present of this tobacco.

You will note the revenue stamp and your memo which was inclosed. The tobacco was put up in 1910, sixteen years ago. But it was in good shape, of remarkable flavor, and was greatly enjoyed by me.

Thought you would be interested in knowing how your tobacco held out in these days of fast living.

Yours very truly,
(Signed) Gordon McDonald.

Pipe smokers prefer Edgeworth for various reasons. Some like it because its quality never changes. Some like it because of its flavor. Others smoke it because they can buy it wherever and whenever they like. Now, Mr. McDonald adds another reason—the quality and flavor of Edgeworth is sealed up everlastingly in the can.

To those who have never tried Edgeworth we make this offer:

Let us send you free samples of Edgeworth so that you may put it to the pipe test. If you like the samples, you'll like Edgeworth wherever and whenever you buy it, for it never changes in quality.

Write your name and address to Larus & Brother Company, 13 S. 21st Street, Richmond, Va.

We'll be grateful for the name and address of your tobacco dealer, too, if you care to add them.

Edgeworth is sold in various sizes to suit the needs and means of all purchasers. Both Edgeworth Plug Slice and Edgeworth Ready-Rubbed are in small, pocket-size packages, in handsome humidors holding a pound, and also in several handy in-between sizes.

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[*On your radio—tune in on WRVA, Richmond, Va.—the Edgeworth station. Wave length 256 meters.*]

Profitable Poultry

By Ralston R. Hannas

The Layers

WHAT are some of the things to watch out for during May in the laying pen? In the first place, do not discontinue the grain and mash system of feeding. The birds do not need so much grain now, however, as they did during the winter and early spring months. The amount of grain that is fed them can be cut to 10 or 11 pounds per 100 birds per day, and the hens will balance their ration themselves by eating as much dry mash as they need. Keep the mash hoppers filled and clean water for drinking before them all the time if eggs are to be expected.

It is only fair to the hens to start them off for the summer season, with the hot months ahead of them, in clean quarters and with clean bodies. Give the houses a thorough cleaning from top to bottom. Select a bright, sunny day and chase the dirt as though you mean business. Remove all movable parts of the interior to the outdoors and clean and disinfect thoroughly, leaving these fixtures in the sun to dry. Brush down the walls, clean out the litter, and scrub the floor, dropping board and roosts with a hot lye solution. If there is only a dirt floor in the house, remove about four inches of the top soil and replace this with fresh soil from another part of the farm, preferably with soil on which chickens have not run before. Disinfect the inside of the house, put in fresh litter to a depth of about six inches, replace the fixtures, put new nesting material in the nests, and wash the windows.

It sounds strange to advise washing the chicken house windows. But, why not? This will make the house much brighter and will react to the benefit of the hens.

Treat the Birds

Then go for the birds. Rid them of lice, either with sodium fluoride or any commercial lice powder. Treat them all on one day, so there will be no chance for birds that have not been deloused to infest the others that have been. The mites will be taken care of if the disinfecting of the nests, roosts and dropping boards has been done thoroughly. Nor is this all. Use a good worm expeller to clean out the birds of these internal parasites—any of the commercial worm removers are good and are not hard to use. The worming is very important, since many direct losses occur from this cause each year, as well as many indirect losses. The indirect losses occur through the birds' vitality being weakened by the constant attack on their systems by the worms; they are then in excellent condition to have most anything attack them and get the better of them.

One thing to watch for among the layers at this season is a trouble known as prolapse of the oviduct. This is the condition in which the bloody tissue is seen protruding from the vent. It is due to a strain on the oviduct of the hen, which in turn is due to forced feeding, an over-fat condition in the bird, constipation, or a general rundown condition of the bird so that she is not able to stand up under the strain of heavy production. If there are only one or two such cases in the flock, there is nothing much to worry about, as it is an individual condition of the particular bird or birds affected. If, however, there are a number of such cases, this can be taken as a sign that there is something wrong with the flock.

The chances are that a too forcing feed is being given in an endeavor to hold up egg production. The thing to do under these conditions is to cut down the amount of meat scrap in the ration to about half. Of course, this will undoubtedly cause a cut in egg production, but this must be the case if the trouble is widespread and is to be cured. After the trouble disappears, the meat scrap may be gradually increased until the normal amount of 20 per cent is again in the ration. See that the birds get plenty of green food. Individuals may be treated by pushing the protruding organ back and applying carbolated vaseline. These birds should also be removed from the flock and kept by themselves so that the others will not pick them and thereby start cannibalism in the flock.

Remove Males

IF THE breeding season is not over in your flock, it soon will be. As soon as the season is over, remove the males from your flock. If they are "just males," that is, if they have nothing particular to recommend them, sell them at once, and plan to get new ones next fall or winter for the following breeding season.

If, however, these males, or some of them at least, are high-class breeders having a pedigree behind them or some particularly good characteristic which you want to breed into your flock, by all means keep them. They should be removed from the flock, though, in order to have the hens produce infertile eggs during the hot summer months. Infertile eggs will keep so much better and will mean a larger income from eggs for the season than if fertile eggs are produced.

Keep all males that are to be held over until next year in a pen by themselves—a pen that is comfortable and roomy, not a little bit of a dirty shack. If space is available and there are some males that are prized more highly than the others, it is a good plan to keep these males by themselves. It has often been said that more good males have been spoiled by the poor care they received between breeding seasons than during the actual breeding season. Many poultry keepers remove their males from the pens at the close of the breeding season, but allow the males to go back into the pens occasionally during the summer for a couple of days to mate with the hens. They claim that their breeding ability will be saved by this system.

Preserving Eggs

THIS is the time of the year of low egg prices. Few farmers realize, however, that they can make money on eggs at this price. It is easily done by preserving some of the eggs produced now, to be used by the family in cooking next fall and winter when the price of eggs is high. By using these eggs, the number of eggs that is ordinarily used by the family from the fall lay can be reduced and those that would be consumed can be sold, thereby having a greater egg income. A case or two of eggs thus preserved will save quite a little money.

Various methods of preserving eggs have been used, such as packing them in salt, lime water, high melting point petroleum jelly or vaseline, and water glass. Water glass is the most common and the most satisfactory. It is not a difficult process. An ordinary four-gallon crock will hold 10 dozen eggs. Scald the crock. Take one part by volume of the water glass—sodium silicate, that can be obtained at any drugstore—and mix with nine parts by volume of water that has been previously boiled and later cooled. This is the mixture that the eggs are packed in. It might be well to explain that this water glass comes in powder form and must be dissolved according to directions on the package before mixing with the nine parts of water. It is dissolved in the least amount of water that will dissolve it.

The eggs to be preserved must be strictly fresh—infertile eggs are the best—and there must be no dirty or cracked ones. Place the eggs in the crock with the small ends down; pack them in nicely. Then pour the solution that has been made up on the eggs in the crock. Make sure that the eggs are completely covered by at least two inches. Put the lid on the crock and store the whole thing in a cool, dark place. Look at the crock from time to time, say, once a month, to see that none of the solution has evaporated; if it has, more of the solution must be added.

It is not necessary to do a large number of eggs at once; they can be preserved from day to day as they are laid, merely by putting in enough of the solution to cover the eggs at the start. As more eggs are added, add more of the solution. If one egg in the lot spoils, the rest are likely to; that is why only the best eggs should be used.

Eggs thus preserved will keep from nine months to a year; the general length of time does not usually exceed 10 months, as they are ordinarily used up in that time. They may be used for any purpose. The only thing that must be done differently from what is done with fresh eggs is in the case of boiling; if they are to be boiled, merely prick a pinhole in the large end of the egg containing the air cell.

Growing Fancy Grapes for Market

(*Continued from page 3*)

ducing a large proportion of scraggly bunches due to unsatisfactory set at blooming time. The first requisite to good maturity is the proper balancing of the crop to the capacity of each vine by careful pruning.

Large Leaf Area Essential

Given a crop of certain size, the culture that is furnished and the fertilizer that is or is not applied will have a marked effect in increasing or decreasing the leaf area. The size of the crop that is being produced does not have a marked retarding influence upon the growth of the shoots until after the fruit has set and the berries have begun to increase in size. Consequently, anything that can be done to secure vigorous early leaf growth will give an increase in effective leaf surface and an important increase in the maturity of good-sized crops. Those things which will hasten growth in the spring are the early application of quickly available nitrogenous fertilizers and the early cultivation of the vineyard. By early cultivation it is meant that the ground shall be plowed or worked up at the time that shoot growth is starting. The application of nitrogen should be made at the time the buds on the canes are beginning to open. One of the best ways to retard the early growth, and so reduce the maturity of the crop, is to permit a crop of rye to come up and head in the vineyard. This is especially injurious in those years when the spring is somewhat dry. It may be mentioned that this encouragement of early spring growth will tend to increase the difficulty of securing a good setting of berries on any vines that have been pruned too severely.

Even though a fairly large leaf area may be secured early in the season, the full benefit of increased maturity of crop may not be secured unless this surface is preserved for the use of the plant. Leaf hoppers frequently reduce the value of the leaves of the vine. This injury is most important when the crop of grapes is large and the insects are abundant. There is a great need for a successful method of destroying the adult leaf hoppers early in the season and thus prolonging the usefulness of the early leaves. Mildew occasionally attacks the leaves of the vine, effectively preventing the maturity of the crop, and infrequently the growers burn the leaves somewhat with improperly made sprays. It should be unnecessary to state that summer pruning reduces leaf area and so should be avoided. All these factors that tend to reduce leaf area decrease the maturity of the crop and so lessen the satisfaction of the customer when he consumes the fruit.

Cultivation Prolongs Growth Period

Cultivation during the growing season will prolong the period during which shoot growth and leaf formation occurs, thus increasing leaf surface. It is doubtful whether shoot growth after August 1 will increase the maturity of the crop. The grower should have controlled the size of his crop and the production of leaves by his earlier culture and pruning so that there is a sufficient number of leaves on his vines by that date. Further growth, particularly if it be very vigorous, may reduce the amount of organic food materials available for maturing the berries. The use of a cover crop instead of further cultivation may help to affect the removal of excessive moisture from the soil and so approximate the condition of dryness which is one of the aids in securing the highest quality of fruit as a result of preventing late season growth. However, these points are not yet proved.

Soils undoubtedly influence the degree of maturity of fruit observed in different vineyards on any given day. A view of maturity may well be taken which considers the time of ripening rather than the maximum maturity which may be obtained. Sandy soils are known to mature their grapes earlier than heavier soils, though it is an open question whether the maximum maturity is any greater than that reached on the loam soils at a later date. Time of maturity may be a matter of considerable importance to the grower if the season should be cut short by an early freeze.

Influence of Phosphorus and Potash

The question of the influence of potash and phosphate on the development of sugar in grapes has some interest to the grower. A considerable number of tests were made last season on that point, using grapes from blocks of vines which have received potash, phosphate and nitrogen for the last four years. These elements had no observable influence on the amount of sugar in the fruit as measured by a simple test of the specific gravity of the extracted juice when the vines were carefully pruned in accordance with their vigor. One year's tests are not sufficient to give a final answer; but if any influence exists, it is not likely to be a large one.

Although the quality of the grape crop depends upon the weather to a considerable extent, the grower can determine the degree of quality that his fruit will show at the harvest to a very great degree. It will be a rare season, indeed, when the careful grower will be unable to produce grapes of a very good quality. It is well to remember that no fancy or No. 1 grapes can be packed unless they are first produced. Marking the best grapes that a vineyard will grow with the No. 1 mark will not make them of that quality if the grower can produce only No. 2 fruit.

Cherry Industry in Door County, Wisconsin

(*Continued from page 10*)

cracks, allowing moisture to escape 10 times more rapidly; neither can it be stirred as quickly after rains. One-half to two-thirds of a driving rain runs off from such a soil and gets away. The soil full of humus, like a sponge, takes up and holds great quantities of water in comparison.

We are all talking cover crops. If you have something growing on the land to produce humus, there is little need of special preparedness. A soil full of humus is much safer for tree roots than one that is worn out and needs a few bushels of oats in the late summer to produce a winter coat.—*Address given before joint meeting of Michigan State Horticultural Society and American Pomological Society, Grand Rapids, Mich., December, 1926.*

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Length of Growing Season Big Factor in Apple Culture

EVERYONE is more or less familiar with the fact that certain varieties of apples are grown in some sections of the country and other varieties in other apple growing regions. What determines such varietal distribution? Is it the soil, the average temperature, rainfall, length of growing season, or a combination of all these factors?

From data gathered during the last four years, J. R. Magness, physiologist of the United States Department of Agriculture, concludes that every apple variety requires a definite number of days to mature its fruit after the blossoming season. Some varieties require 165 to 175 days, others 150 to 155, and still others ripen in less than 140 days from blossoming time. Apparently this time interval for maturity holds good for the different varieties regardless of other factors such as soil and climate, although these latter factors do have a bearing on quality.

A careful analysis of the commercial adaptation of apple varieties in different sections of the United States indicates that this length of season required to bring any variety to maturity is the most important factor in its distribution. Varieties requiring 160 days or more, such as Winesap, Arkansas, Stayman Winesap or Yellow Newtown, are strictly limited to the South, the middle latitudes, and the Pacific Coast sections where normal blossoming time is about May 1 or earlier, and first frosts occur about 160 days later. Varieties requiring 140 to 150 days to ripen, such as Jonathan, Delicious, or Baldwin, may be grown in the apple districts of the North where they are used as winter or storage apples. When grown in the South these short-season varieties are fall apples, and if held successfully must be placed at once in cold storage. Generally, winter storage varieties most suitable for any particular section of the country are those varieties which do not attain maturity until cool weather prevails.

Home Fruit Gardens on Northern Great Plains

FRUIT GROWING for home use on the northern Great Plains is of decided importance, says the United States Department of Agriculture, since it makes farm homes more attractive and the population more contented and permanent. Although the production of good fruit in this area is difficult and commercially unprofitable because of cold, drought, and drying winds, nevertheless, says the department, if a suitable site is chosen, hardy varieties planted, and the plants given proper care, the grower will be repaid for his efforts.

The site should be nearly level or sloping toward the north or northeast. Good air drainage is desirable, and at least fairly good soil. A location close to farm buildings is most convenient, and a shelter belt of trees is needed to protect against west, south and north winds. Give the land thorough preparation, preferably by fallowing, so that planting may be done in moist soil. Cultivation, pruning, spraying and protection from rabbits and mice are essential to success. It is advisable to order first-class one-year-old or two-year-old trees from a reliable northern nursery.

The hardier varieties of apples, crabs, plums, plum and sand-cherry hybrids, sand cherries, June berries, currants, gooseberries, raspberries, strawberries, native fruits, and perhaps a few of the hardier varieties of grapes, can be grown with more or less success, depending on the district, site and the care given. Peaches, pears, apricots, quinces, cherries, blackberries, dewberries, grapes and nuts are not generally hardy, and the planting is, therefore, not advised.

Results of experiments in fruit growing conducted by the department at its Northern Great Plains Field Station, Mandan, N. Dak., have recently been published in Farmers' Bulletin 1522-F, "The Home Fruit Garden on the Northern Great Plains." A copy of the new publication, which contains detailed information of vital interest to farmers and others in the area, may be obtained free while the supply lasts upon request to the Department of Agriculture, Washington, D. C.

Planting of Nut Trees

By A. S. Colby
University of Illinois

MOST of the failures reported in transplanting nut trees may be traced to the use of incorrect methods of practice.

Nut trees are more difficult to transplant than fruit trees, but the operation will usually be successful if certain factors are kept in mind.

In the first place, nut trees have an extensive root system, and much of this root system is left in the ground when the trees are dug. This occurs in spite of the fact that most nurserymen root prune nut trees at least once in the nursery before they are dug. In transplanting such trees, the top must be severely cut back, at least one-half, to compensate for the loss of roots incurred in digging. Neglect to do this has resulted in the loss of many nut trees at planting time.

Secondly, the tree must not be allowed to dry out at any time, especially after being received from the nursery. Nut nurserymen take special pains to insure safe arrival of their trees through extra care in packing. When the trees are received, they should either be heeled in or placed in a cool cellar until the ground is ready for planting. It is often a very good plan to immerse the trees, roots and all, in a long trough filled with water for a few hours before transplanting. Considerable moisture is taken up through the bark and at the cut ends of the roots.

In the third place, there are certain essentials in the digging of the hole, adding plant nutrients to the soil in the hole, and the actual setting of the trees, to be considered.

Planting should not take place when the ground is wet; neither is it desirable to use water in the holes as the trees are being set. Under such conditions, the soil will tend to harden and shrink away from the roots on drying. It is preferable to plant in rather dry soil, tamping the dirt well about the roots to eliminate air spaces.

The hole should be dug deep and wide enough to accommodate the roots without crowding or bending them upward. The tree should be planted at least two inches deeper than it stood in the nursery. The soil mark on the trunk may be used as a guide here. If the soil is found to be poor as some depth is reached in digging, only good top soil should be used in filling in about the roots when the tree is set. Do not use manure or nitrate of soda or other concentrated fertilizers in the hole near the roots. A couple of handfuls of bone meal or tankage may, however, be mixed with the soil about the roots with benefit.

After the tree is set and the hole is being filled, a basin like depression may be left at the base of the trunk to be filled with water, which is allowed to soak down to the roots. A mulch of strawy manure may be used to advantage, especially the first season. Care, however, must be taken to protect the young trees from the attack of rodents with the approach of freezing weather in the fall, since they will be attracted by the partial shelter afforded by the mulch. Another method of securing a sufficient water supply close to the roots is through the use of a small drain tile placed in an oblique position and sunk to its depth close to the trunk. This tile should be filled with water occasionally during the dry season. Surface watering is not recommended.

The first year is the most important in the life of the newly planted nut tree, and extra care at this time will result in a healthy and vigorous growth.

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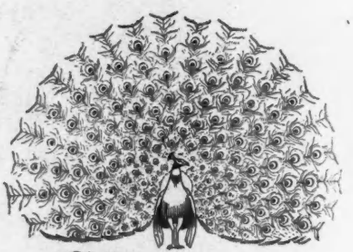

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